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June 26, 1950

STEEL

The Magazine of Metalworking and Metalproducing

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GOOD VISION IS IMPORTANT TO CRANE OPERATORS, TOO!

Good vision is vitally important to aerial gunners—and crane operators, too! The operator must be able to see over a wide working area if he is to spot his loads quickly, accurately, and safely.

Wide-angle vision is built into the New Whiting Crane. In its Full-Vision Cab, the operator remains comfortably seated at all times, yet he can clearly see the entire working area!

The new cab, in combination with Whiting Magnetic Crane Control, practically eliminates dangerous "crane-operator fatigue"—*insures* efficient and safe crane operation.

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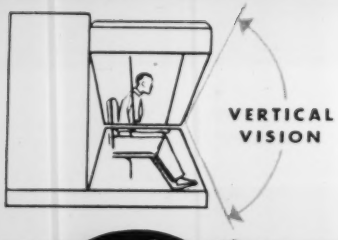

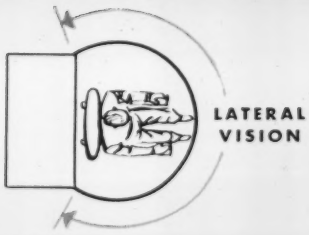

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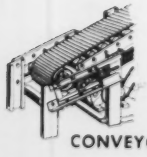
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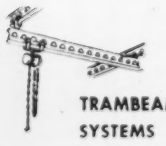
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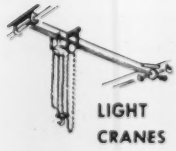
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Counting is good business for any product . . . X-ray tubes . . . machine tools . . . engines . . . rat traps . . . textile machinery . . . guns . . . electronic equipment . . . and now, what's *yours?* Among the thousands of Veeder-Root "success stories," there is probably some experience which may point the way to uncounted opportunities for you, too. And the quickest way to find out is to get one of your design engineers together with one of ours, and let them probe for new profits. *Say when.*

FREE 8-page "COUNT BOOK" shows standard and some special types of V-R Counters for mechanical, electrical and manual operation. Write for your copy today.

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Behind the Scenes...

The Crystal Ball

Well, good old 1950 is nearly half over. What a year it has been from an economic standpoint thus far! The editors upstairs have had to remake STEEL'S industrial production chart twice this year to keep the index line from running off into the top margin.

What about the rest of the year? How many cars will be made in the next half? Will prices go up? Will you get that raise?

The editors next week will answer a lot of those questions in a special midyear look at economic things to come. Managing Editor Walt Campbell and his cohorts have their crystal ball all polished up to give you some sharp predictions. But that's not all. They are tabulating the results now of a special questionnaire sent out to hundreds of metalworking companies asking what the producers, buyers and sellers on the front line think about the economic outlook.

That will be incorporated in a special midyear summary coming out July 3. The job is designed as an up-to-date supplement to STEEL'S big Metalworking Yearbook issue that came out last Jan. 2.

More Coming

The midyear report is not the only special job the editors have cooking. We'll announce more soon.

Two other special studies already carried in the magazine are still in the editors' "current" file because of the volume of requests for reprints. They are the depreciation stories carried May 8 and last week, June 19.

If you want reprints of either or both of these, write Readers' Service Department, STEEL, Penton Bldg., Cleveland 13, Ohio.

Hands Across the Sea

Got $20,000 to spare? We've just received a letter from one Ernst G. Schwenke of Frankfurt, Germany, who's looking for an American capitalist to back him on an invention to copy small sculptures. The device—it can be connected to an electric tool or a dentist's drilling machine—is "an instructive toy for teen-agers and a tool for all people liking a hobby in their spare time," says the inventor. It will sell for less than $100.

We're interested in this for two reasons: The device sounds ingenious; the inventor even more so. He frankly admits he hopes that some contact made by means of his invention will enable him to emigrate to the U. S.

Poetry Corner

Astigmatic and ulcerated editors sang and cheered when they read the following in the summer issue of Sloss - Sheffield's *Pig Iron Rough Notes*. Try it for size yourself, to the tune of *Wearin' of the Green*:

The typographical error is a slippery thing and sly;
You can hunt 'til you are dizzy, but it somehow will get by.
'Til the forms are off the presses it is strange how still it keeps;
It shrinks down in a corner and it never stirs or peeps.
O the typographical error is too small for human eyes;
'Til the ink is on the paper, when it grows to mountain size.
The boss he stares with horror, then he grabs his hair and groans;
The copyreader drops his head upon his hands and moans.
The remainder of the issue may be clean as clean can be
But that typographical error is the only thing you see.

(L'envoi—by us)

Now on STEEL *each week the boys all peek to spot those little duds,*
But they still get by each jaundiced eye—so reader pass the suds.

Puzzle Corner

Walter J. Okray of Kleenaire Corp., E. L. Sweet of Standard Gage Co., R. B. Bagby of Bagby & Co. and C. Gardner of Orinoco Mining Co. were the first in with correct answers to the weighing problem June 12. Four weighings are necessary.

Try this one. Use each number from 1 to 9 inclusive once and only once and have them add up to 1. Multiplication and subtraction are not permitted.

Shrdlu

(Editorial Index—page 35)

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countires, one year $18. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

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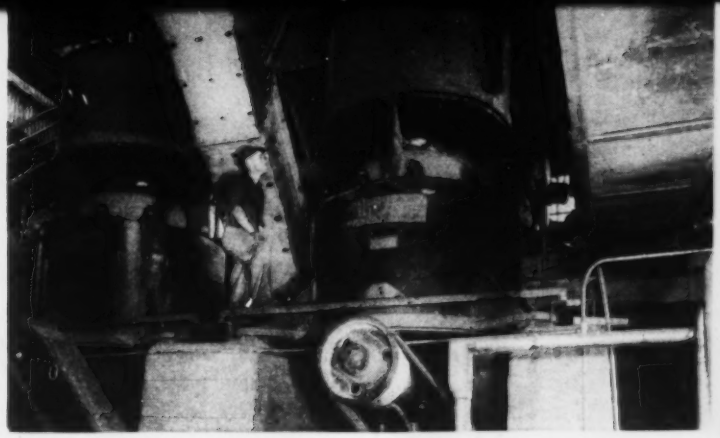
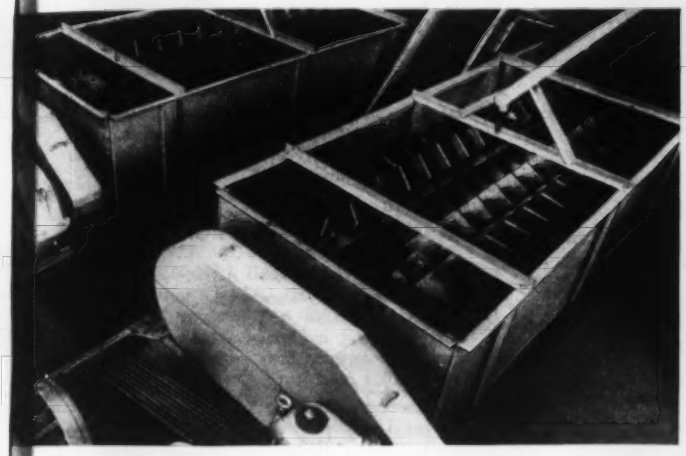
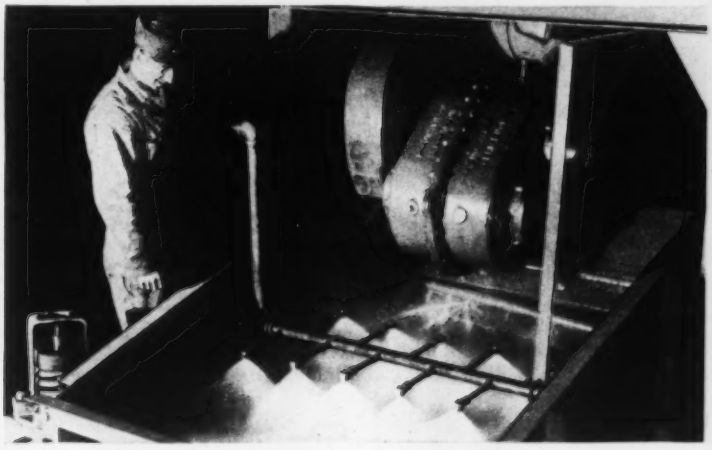
3 **TOUGH, ABRASIVE, LOW GRADE** iron ores are crushed in high output primary gyratory and jaw crushers. This 60-in. Superior-McCully crusher is in use in the Lake Superior region. Write for Bulletin 07B6004 for complete details on this type of crusher.



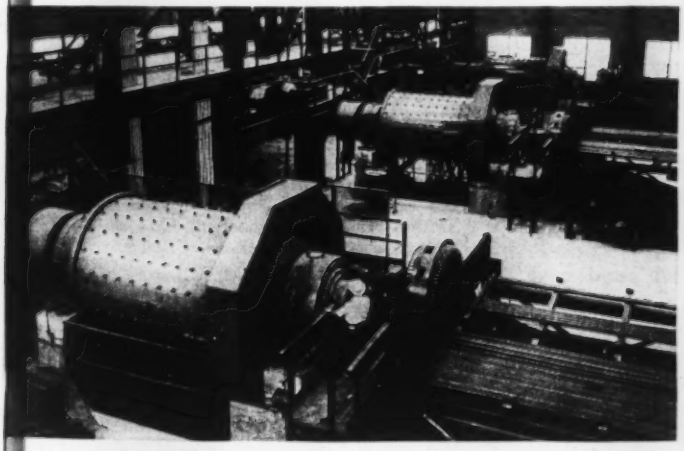
4 **FINE REDUCTION** of the iron ore is often accomplished with *Hydrocone* gyratory crushers. Two are seen working in parallel at this Adirondacks iron mine and beneficiation plant. Write for Bulletin 07B7145 for complete description and operating data.



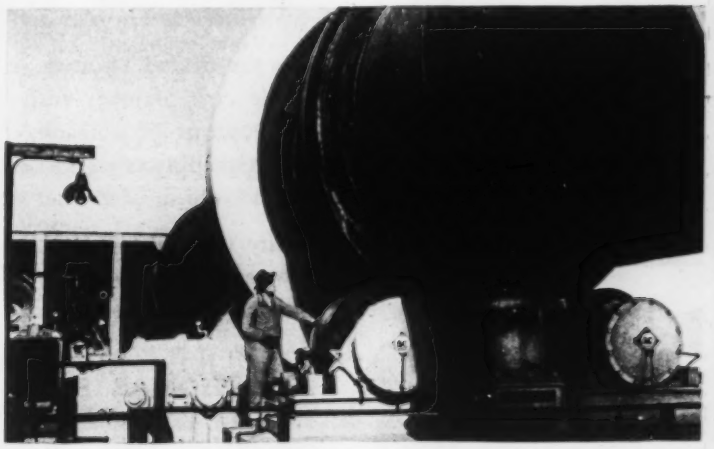
5 **THESE LOG WASHERS** are used to remove silica and medium sticky clay from crushed iron ore. Contra-rotating steel paddles produce a scuffing, scouring and sluicing action. Allis-Chalmers makes all basic types of washing equipment. See Bulletin 07B6411.



6 **IN CONCENTRATING IRON ORE** by the heavy density process, *Low-Head* vibrating screens are widely used for recovering media. The first screen section drains the media while the second section washes at this Minnesota plant. Write for Bulletin 07B6330.



7 **IRON ORE IS FINELY GROUND** in three A-C 8 ft x 12 ft rod mills ahead of magnetic separation at this Adirondack plant. A-C builds *five* separate types of grinding mills to meet varying plant requirements. Request Bulletin 07B6718 for full details.



8 **NODULIZING OF BENEFICIATED IRON ORE** so that it can be used efficiently as blast furnace feed is the job of this Allis-Chalmers 11 ft, 6 in. x 300 ft rotary kiln at a southern iron mine and beneficiation plant. Bulletin 07B6368 contains full description.

EQUIPMENT FOR IRON ORE BENEFICIATION: Hoists . . . Jaw and gyratory crushers . . . Vibrating screens . . . All types of washers . . . Concentrating jigs . . . Grinding mills . . . Rotary kilns and coolers . . . Centrifugal pumps . . . *Texrope* V-Belt drives and sheaves . . . All types and sizes of Electric motors . . . Starters . . . Complete power generation, distribution, control equipment. Write for literature.

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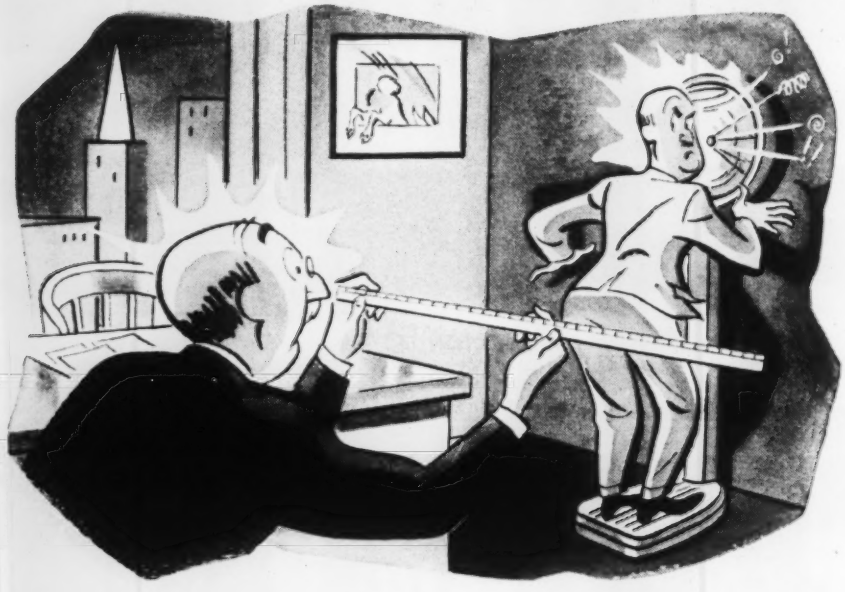


"Aha, Plunkett! . . Twenty!"

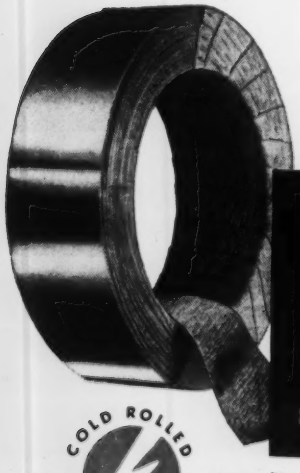
And those extra inches of BREADTH *carry plenty of* impact *. . . tip the scales to expanded markets and new sales peaks!*

★ ★ ★

. . . THAT IS—in the case of *BRASS PRE-COATED* Thomas Strip—*NOW* available up to *TWENTY INCHES wide!* It's the same high-quality prime cold-rolled steel base as before—plus a *better, more generous* brass pre-coat due to new, improved and expanded facilities at Thomas Steel.

This wider, better brass pre-coated Thomas Strip may radically change your whole cost picture—and with it, your market potentials and your profit outlook. Now all the *economies* of pre-coated strip apply as well to stampings and parts of larger section and tubing of greater diameter.

This is your opportunity to broaden YOUR market and throw your *new* weight around—profitably! May we send you samples and additional data?



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LETTERS
TO THE EDITORS

OPA Flashback

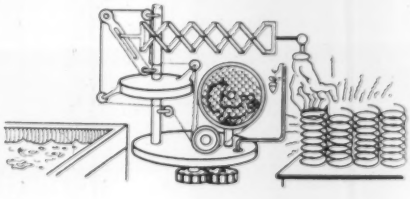
We would like to obtain the mill price on 12 or 12½ gage black and galvanized barbed wire, 4 point barb, as of June, 1946. Was an OPA ceiling in existence at that time? Information on the availability of barbed wire in general during June, 1946, would also be appreciated.

Louis Klatzker
Dulien Steel Products Inc., Los Angeles, Calif.

• *Prevailing price for 12½ gage galvanized barbed wire with 14-gage barbs, 5 inches apart, was 3.51 cents per pound for 80-rod spools in car loads, 3.69 cents in less than car loads. Prices were based at Pittsburgh or Chicago and established by Office of Price Administration. Demand was strong and producers were far behind on shipments.*

Motivated by Automation

In the article, April 3, 1950, "Automation", by A. H. Allen, your Detroit editor, there is a photograph on page 104 showing a device which picks up a hot coil spring and lifts it into an oil quenching machine. As a builder of in-



dustrial furnaces, we are greatly interested in learning more about this equipment.

W. E. Quillian, Assistant Sales Manager
W. S. Rockwell Co., Fairfield, Conn.

• *More information can be obtained on the equipment in question from Harry Sahlin, Salem Engineering Co., 467 S. Woodward, Birmingham, Mich.*

Stainless Numbers

We should like to have some explanation of the types of stainless steel referred to in your "Market Prices". There are indications regarding the prices of stainless steel types 301, 302, 303, etc. We are not very well acquainted with the various grades usually employed in the American market; our interest is in knowing what exactly is understood by these designations.

Drs. Kallos & Vamos
Hungarian Steel Industries Foreign Trade Corp., Budapest, Hungary

• *Number designations for stainless steel refer to steel types based on chemical composition, limits and ranges. Thirty analyses are standard in the industry. Each has distinctive characteristics and the chemical composition ranges are designated by number which serves as a means of identification. For complete information, write to American Iron & Steel Institute, Empire State Bldg., New York, N. Y.*

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STEEL

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Next Week ... **Midyear Revue and Forecast Issue ... Chrome Plating Stainless Assemblies ... Induction Furnace Cuts Zinc Loss ... Both Seamless and Welded Tubing Processed in New Mill**

Maintain Operating Accuracy

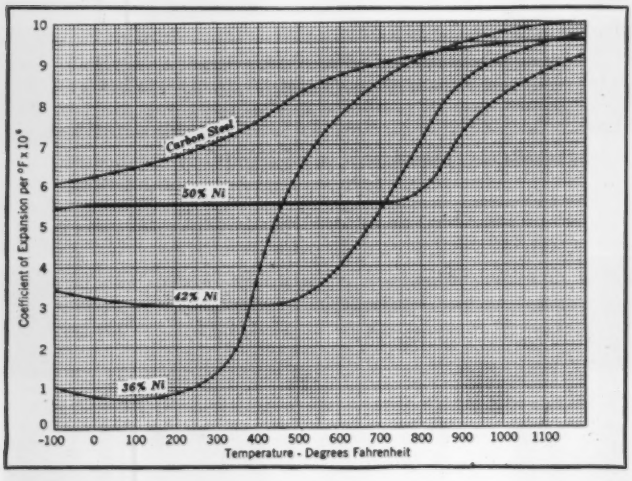
BY USING

Iron-Nickel Alloys

TO CONTROL THERMAL EXPANSION

Any desired coefficient of expansion, ranging from almost zero to a value greater than that of ordinary steel, may be obtained with the iron-nickel alloys. In addition, these alloys are strong, tough, ductile and possess a useful degree of corrosion resistance.

In wide use is a 36% nickel alloy... aptly named "Invar" because its dimensions remain almost *invariable* over the range of atmospheric temperature variations. However, as nickel content goes higher, expansion increases continuously. The chart, below, shows the thermal expansion characteristics of Invar and two other high nickel alloys, along with those of carbon steel for comparison.



EMBLEM OF INCO SERVICE TRADE MARK

The International Nickel Company, Inc.
Dept. S, 67 Wall St., New York 5, N. Y.

Please send me further information about Iron-Nickel Alloys.

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

FABRICATION

Like all austenitic alloys, those of the iron-nickel system respond well to plastic deformation, either hot or cold. They may be welded by any of the commonly used methods, and users report their machining characteristics are very similar to those of other high nickel alloys such as Monel® and Inconel®. A special, free-cutting grade is available to meet exacting machining requirements.

APPLICATIONS

Where dimensional changes with temperature must be minimized, or where such changes must approximate those of other materials of relatively low expansivity, iron-nickel alloys... sometimes modified by other alloying elements... are almost universally used.

For example... in thermostatic bimetal strip, Invar serves as the low expansion side for use up to moderately elevated temperatures. At higher temperatures, the 42% nickel alloy is commonly used. For the high expansion side, special alloys, containing 15-25% nickel, are used extensively because they develop nearly double the expansivity of iron. Iron-nickel alloys are also widely used in glass-to-metal seals, where expansivity of the glass must be closely matched. The 42% nickel alloy, sometimes with added chromium, is used with soft glasses. Hard glasses call for nickel alloys containing added cobalt.

Scores of other iron-nickel alloy applications include bases for giant telescopes, surveyors' tapes, radio condensers, parts for textile machinery and for numerous precision instruments and devices.

Industrial fields of usefulness for the iron-nickel alloys are far from exhausted. These unique materials can be of incalculable value in improving instrumentation and process control, and in the design of new devices. They are available in various forms including wire, rod, strip, sheet, bars and tubing. Send coupon today for additional information on the properties of iron-nickel alloys... they may be the means of improving your products, equipment, or process.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

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June 26, 1950

Both Sides of the Street

Sad to relate is the undeniable fact that many policies of the federal government are determined to a shocking extent on the basis of politics of the crudest precinct order. Decisions on vital national problems are not made on the basis of what is best for the public. On the contrary, they are made on the basis of what promises will yield the most votes in the November elections.

To illustrate this point, consider the present attitude of the federal administration toward industry. To listen to the frequent sincere speeches of Secretary of Commerce Charles Sawyer, you would think that American industry is a saint which has been unjustly maligned by numerous governmental agencies. Recently he has said things which sharply contradict almost every evil charge that the antibusiness crowd in Washington has hurled against industry. However, his sympathetic remarks about industry are overwhelmed by the constant barrage of smear campaigns conducted against industry by virtually all other governmental spokesmen.

What does this mean? It means that Mr. Truman, exulting in the role of master politician, is trying to work both sides of the political street. Down one side goes Secretary Sawyer uttering niceties which appeal to all industrialists. Down the other side of the street go representatives of the Federal Trade Commission, Department of Labor, Department of Justice, antibusiness congressional committees and many others all damning "big business" as an oppressor of "small business." It was no accident that Representative Frank Buchanan's inquisitorial questionnaire about lobbying was sent only to 166 of the largest companies. It is but one of a series of demagogic appeals to array the numerous votes of "small business" against the few votes of "big business."

This renewed attempt to divide industry into opposing camps should be resisted vigorously. There may be some points on which "big business" and "small business" are at variance, but the area of disagreement is unimportant compared to the desirability of presenting—on the part of all industry—a united front against the destructive, antibusiness trend of the Truman administration toward socialism.

For Trumanites to promise reforms that will help "small business" at the expense of "big business" is pure demagoguery. Trumanism is bad for all industry.

* * *

THEY ASK NO FAVORS: Several metalworking companies are celebrating their golden anniversaries this month. Among them are Browning Crane & Shovel Co., Cleveland; Beaver Pipe Tools Inc., Warren, O.; Reid Brothers Co. Inc., Beverly, Mass.; and Coleman Co. Inc., Wichita, Kans.

Case studies of corporations which survive 50 years of competition usually make a good argument for the American system of private enterprise. The traditional theme revolves about the initiative of a go-getter who, starting on a shoe string, develops a profitable business which contributes importantly to the economic growth of the nation. Conforming to this pattern is the history of the Coleman Co. Fifty years ago the company started in business with 16 sample lamps. In intervening years, it developed gasoline pressure lamps and similar products. Today it is doing a gross business of $24 million annually.

Any company, such as the Coleman Co., which started 50 years or more ago and continues to operate profitably today, owes its success to the

(OVER)

qualities of initiative, ability, good judgment and resourcefulness which have made this nation great. They came up the hard way. They did not have the advantage of government subsidy, RFC loans or other crutches which the present government administration deems to be necessary for the survival of "small business."

Hail to the fiftieth anniversary celebrants! They stand firmly on their own feet and ask no favors at a time when their government is literally begging them to accept unwanted "handouts." —p. 55

* * *

CONFUSION CONTINUES: In vetoing the O'Mahoney freight absorption bill, President Truman declared that recent court decisions and statements of the Federal Trade Commission have made it "quite clear that there is no bar to freight absorption or delivered prices as such." Throughout his veto statement, the President inferred that the confusion over pricing methods has diminished and that honest sellers have nothing to fear.

It is true that under present market conditions, freight absorption is not of prime importance in the sale of some products. However, it will assume importance when a buyers' market causes a revival of intense price competition. When that time comes, sellers will be under heavy pressure to absorb freight. They will remember that the Supreme Court ruled that the mere fact cement prices were uniform on a delivered basis was in itself a sign of collusion. Certainly the point as to what constitutes collusion should be clarified. —p. 43

* * *

SERVICE DISCONTINUED: American Iron & Steel Institute on June 15 cancelled and withdrew its book on freight tariffs for iron and steel. It announces that it does not plan to compile or publish such information in the future and suggests that subscribers to the book desiring freight rate information should now apply to their own traffic departments or to the railroads.

Of course the book was discontinued because it was under fire from the Federal Trade Commission and some other Washington critics. Perhaps it was wise to withdraw it. Nevertheless it never was a price-fixing device and it did serve a useful function in providing in one handy volume information which otherwise would have to be sought from numerous sources. It is a shame that small producers, having small traffic departments or none at all, will be inconvenienced just because a few officials in Washington are unduly suspicious and vindictive.—p. 44

* * *

STORED ENERGY WELDS: A Detroit company has developed a method of welding studs to base metals with no fluxes or special preparation of the base metal by means of a "stored energy" welder readily adapted to mass production. Equipped with hopper feeds and indexing tables, the welder is capable of making up to 4000 welds per hour.

Key to the process is a small tip on the joining face of the stud. As this tip contacts the workpiece, ionization takes place, cleansing both surfaces. An arc results, which melts the full diameter of the stud and a corresponding area of the workpiece. At this stage a hammer blow struck by a moving piston in the welding gun completes the weld. The entire welding cycle takes place in 0.001-second.

The process is employed on many types of stud welding jobs, ranging from small nameplates to large brackets and other formed pieces which must have studs for attachment. It successfully welds some dissimilar metals. —p. 72

* * *

STEEL LURES BUYERS: A postwar phenomenon in motordom is the marked rise in the popularity of station wagons. Last year about 120,000 of this type of passenger car model rolled off the industry's assembly lines. This means that annual output of station wagons has practically quadrupled since 1941.

Contributing to the growth in demand for these vehicles has been a marked improvement in materials and finishes. The early station wagons had bodies constructed largely of wood. Assembly and finishing were laborious operations, requiring much hand work. Substitution of steel for wood in the body structure, which has been gaining steadily since the war, has simplified body construction and opened up new opportunities for attractive finishes. Improvement of methods of transferring simulated wood grain to steel panels, introduction of interior trim of plywood and other materials and use of more durable upholstery have enhanced the permanence of station wagon finishes. —p. 57

E. L. Shaner

EDITOR-IN-CHIEF

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News Summary

THE RESIDUE— When President Truman vetoed the bill to legalize absorption of freight, he said he did so because there was no need for it (p. 43). Present laws and court decisions, he says, make it "quite clear" that industry can absorb freight to meet competition. It's been as clear as mud to the steel industry for nearly two years. You can absorb, yes, but the laws' provisions for many specific circumstances are murky. What steel and related industries want is: One comprehensive law to make plain what can and cannot be done in absorbing freight. What happens now? Industry must continue to feel its way along, hoping to find the clarity already so obvious to the President.

DEAF EAR— Even some government officials are now tacitly admitting that the federal tax policy is short-sighted and unsatisfactory (p. 50). The trouble is that administration tax schedules are virtually dictated by the Treasury Department. Objections voiced by most non-Treasury members of the Truman family are often ignored. When Commerce Secretary Charles Sawyer, for example, made tax recommendations early this year, his ideas got nowhere with Treasury Secretary John Snyder. How can Treasury's strangle-hold on tax policies be loosened? One proposal is for an interdepartmental committee to decide on taxes. The plan is making little headway thus far.

TARIFF TROUBLE— Tin plate makers are alarmed about the possibility of lower tariffs on foreign plate coming into the U. S. (p. 46). They already have lost some foreign markets to British and other European competitors. Domestic manufacturers are afraid that lower American import duties will give them trouble on their home ground, too.

CRICKET AND SHAKESPEARE— In northeastern England lies Yorkshire, a county that is one of the most important industrial areas in Great Britain and Europe (p. 54). The region's metalworking industry has survived more than 150 years of war and economic upheaval. Now it's struggling with nationalization. Such private firms as the 157-year-old Newton Chambers & Co. Ltd. are trying to keep public ownership at arms length with their own paternalistic program of company schools and sponsored social activities in sports and drama. Is that enough?

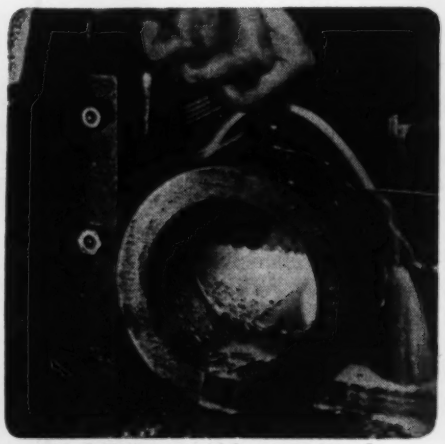
THAT QUEASY FEELING—Economists may be afflicted with a sensation similar to that feeling in the pit of your stomach when you go up in an elevator too fast. The short-term outlook is sensationally good, but analysts are uneasy (pp. 60-63). They predict no collapse, but they do point out: The consumer credit load is ominously heavy; prices are too high; our foreign markets are dwindling. But the current production pace is still breath-taking. In the week ended June 17, STEEL's production index reached a preliminary 217, another new high. More than 800,000 motor vehicles will be turned out in June. Last week for the tenth consecutive period, steelmaking operations exceeded 100 per cent of capacity.

IN THE AIR— Industrial expansions are on the increase (p. 47). Four were announced or completed for the steel industry alone last week. National Steel Corp. will spend at least $25 million to boost its ingot capacity by 500,000 tons yearly. Allegheny Ludlum Steel Corp. will add three new rolling mills to its facilities. Bethlehem Steel Co.'s West Coast subsidiary has installed a 75-ton electric steelmaking furnace. Youngstown Sheet & Tube Co. will build four open hearths at East Chicago, Ind., to produce 550,000 to 600,000 tons of ingots yearly. Net gain will be 250,000 tons when old facilities are discarded.

HERE AND THERE IN INDUSTRY—Makers of materials handling equipment expect a $1 billion sales year for 1950 (p. 45) . . . Arthur G. McKee & Co. reportedly has been awarded a contract to build a steel plant in Colombia (p. 45) . . . Lockheed Aircraft Corp. is spending $5 million to expand its facilities to meet requirements of the jet age (p. 49) . . . A. O. Smith Corp. of Texas will fabricate nearly 1300 miles of pipe ordered by Texas-Illinois Natural Gas Pipeline Co. (p. 49).

Production-Engineering News—p. 71 *Market Summary*—p. 103

Everything in Tubing . . .



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STEEL
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It's OK To Absorb Freight

And there's nothing wrong with quoting delivered prices either, says President in vetoing freight absorption bill. Just make sure there's no collusion or concerted action

NOW that the O'Mahoney freight absorption bill lies dead under a Presidential veto is freight absorption by steel companies gone forever?

Not necessarily.

Statements by the President in his veto and a few days earlier by the Federal Trade Commission in connection with a proposed "cease and desist" order in the Corn Products Case emphasize there is no objection to freight absorption and delivered prices as such; the only objection is to use of them in concerted action, collusion and conspiracy.

The $64 Question—What would be considered concerted action, collusion and conspiracy? That question makes steel company attorneys hesitant to agree that return to freight absorption and delivered prices would be legally safe and wise. If one producer absorbed enough freight charges to make his delivered price competitive with that of another producer would the fact that both of the prices were the same be construed as the result of collusion? Businessmen have argued uniformity is inescapable in a competitive economy. In the Cement Case decision, the Supreme Court ruled that the fact that cement prices were uniform on a delivered basis was in itself a sign of collusion.

Right now, freight absorption is not of prime importance in the sale of steel. Demand is so great that consumers in most instances are willing to pay the freight to get material. But some day that may not be the case.

There was conjecture that small producers who feel their actions will not be watched closely by the Department of Justice and the Federal Trade Commission will take courage from the President's veto statements and absorb freight freely wherever competition makes it necessary to do so. Some small producers never did depart from the practice.

When reduced demand strengthens the competition for business the large producers too may hearken back to the President's veto statements and decide it is worth the risk of legal action to engage in freight absorption.

In vetoing the O'Mahoney freight absorption bill (S. 1008), President Truman said that much uncertainty surrounding the antitrust laws had been removed by court decisions and by FTC statements and no change in the law is necessary.

Blow or Boon—There were mixed reactions to his veto. Some people considered it a blow to business; others thought because of the wide differences in interpretations of the bill's meaning and effects the veto is is a good thing. Anyway a certain amount of clarity has been brought into a picture which had people confused since the Cement decision. In the two years of work on S. 1008 several key government enforcement officers, forced into a corner by congressional committees, completely abandoned the tenet that the only method of selling that was safe under the law was mill pricing, and admitted that freight absorption and delivered prices are legal unless done by collusion, conspiracy, etc.

In his veto message, President Truman said recent court decisions and FTC statements have made it "quite clear that there is no bar to freight absorption or delivered prices as such.

"Still further clarification of the antitrust laws can be expected when decisions are reached in a number of cases now under considerations by FTC and the courts," he added.

"The recent court decisions were effective in eliminating certain clear abuses of competition," Mr. Truman said. "The sponsors of this bill recognize the merit of these decisions. In none of these cases have legitimate competitive practices been prevented by the courts. Moreover, industries affected by these court decisions have demonstrated their ability to adjust to the law with respect to the absorption of freight and delivered pricing, as now interpreted, without apparent injury to themselves or to the economy.

"Fear Not"—"I recognize that busi-

Ride Herd on FTC

The freight absorption bill veto brought quick retaliation from the bill's proponents.

Sen. Edwin Johnson (Dem., Colo.), chairman, Senate Interstate & Foreign Commerce Committee, appointed a subcommittee to "ride herd" on the Federal Trade Commission and see that it abides by its announced attitude that freight absorption and delivered prices as such are not illegal. Senator Johnson heads the subcommittee. Other members, all proponents of the freight absorption bill: Senators Myers, O'Connor, Capehart and Bricker.

NEA

THEY GOT THEIR WAY

. . . in joyful mood are these Democratic senators and representatives. They wanted President Truman to veto the O'Mahoney freight absorption bill. He did. Left to right: Sen. Estes Kefauver (Tenn.), Sen. Hubert Humphrey (Minn.), Rep. Joe L. Evins (Tenn.), Sen. John J. Sparkman (Ala.), Rep. Hugh Mitchell (Wash.), Sen. Herbert Lehman (N. Y.), Rep. Wright Patman (Tex.), Sen. Lister Hill (Ala.), and Sen. Paul H. Douglas (Ill.)

nessmen have been concerned lest they be penalized for perfectly sensible and appropriate competitive action. I believe their concern is unwarranted. If in the future there should be clear evidence to the contrary, the law should, of course, be changed," the President asserted.

"On the basis of the present evidence, however, I am convinced that no change is necessary, and that in attempting to affirm what is already true, the bill goes further and would hamper, instead of help, the preservation of fair competition," the President stated.

Freight Rate Book Out

Institute discontinues compilation and publishing of freight rates on iron and steel

THE American Iron & Steel Institute no longer provides a railroad freight tariff book on iron and steel. It canceled and withdrew it on June 15, and will no longer supplement it or keep it up to date.

Further indicating finality of the institute's action is its statement that it does not plan to publish this freight tariff book or any other freight tariff book in the future. For rate information, subscribers to the book should now apply to their own traffic departments or carriers, the institute suggests.

Didn't Like It—For some time the Federal Trade Commission has objected to the freight tariff book. The commission looked upon it as a price-fixing device. Late last year steel industry attorneys in proposing to accept a consent decree in settlement of the FTC suit against the industry's former multiple-basing point, delivered-price system offered to stop co-operating with one another through the institute in compiling freight tariff books or lists of freight rates for use in pricing of steel products. The consent decree never was accepted by the FTC because of disagreement among commission members and staff about the commission's authority to accept it.

In compiling the rates the institute had the assistance of steel companies.

Little Fellow Hurt—Small steel companies—those having small traffic departments or none at all—are expected to be hampered the most by the institute's abandonment of freight rate book activity. The large steel producers have traffic departments adequate to supply their sales and shipping departments with freight rate information.

Now the small producers will have to rely on hearsay or call upon carriers for information on the complex subject of freight rates.

Since steel producers adopted the practice in mid-1948 of quoting mill prices, there has been reduced need for the freight rate book. Under this pricing system, the consumer in most instances pays the railroad directly for transportation of steel, although there are exceptions under which the consumer, in deference to his wishes, is shipped steel with the freight prepaid by the steel producer; the producer then bills the consumer for both the steel and freight.

Indispensable Then — Under the steel industry's former system of quoting delivered prices and absorbing freight it was imperative that the producer have complete freight rate data for use in determining how much freight, if any, it would have to absorb to be competitive with other producers.

The steel industry has not shared the FTC's opinion that the institute's freight rate book is a price-fixing device. Supporters of the book contend that it merely was a compilation into one handy volume of the rates charged by railroads for transporting iron and steel.

Indicative of the vastness of the subject of freight rates, the institute's book on only iron and steel required several hundred pages of tabular matter.

Workers Are Safer

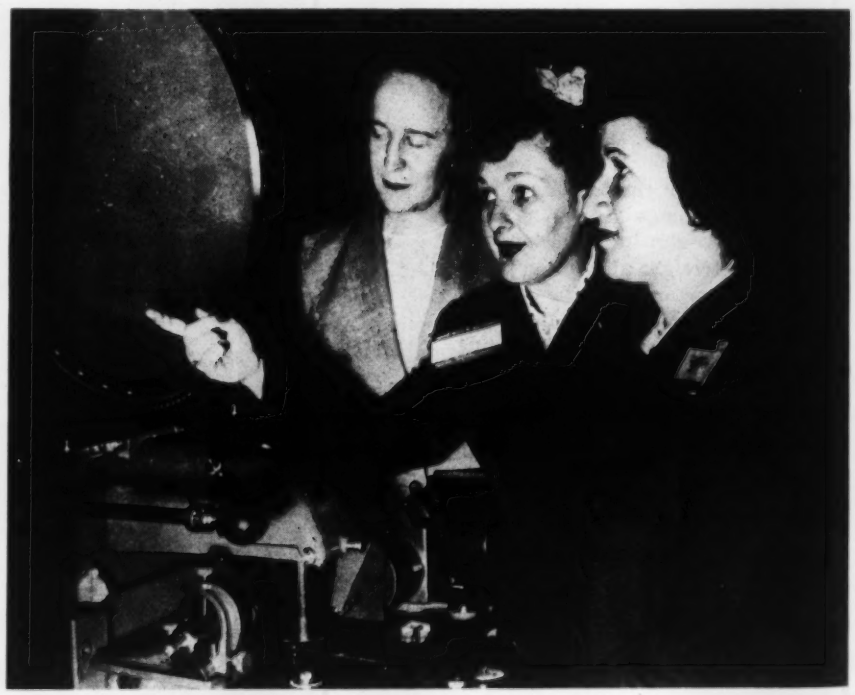
American workers were a lot safer in 1949, the National Safety Council reports.

Industrial injury rates for last year, released by the council in advance of the 1950 edition of its annual statistical yearbook, *Accident Facts*, show a substantial reduction in the frequency and severity of 1949 accidents compared with those in 1948.

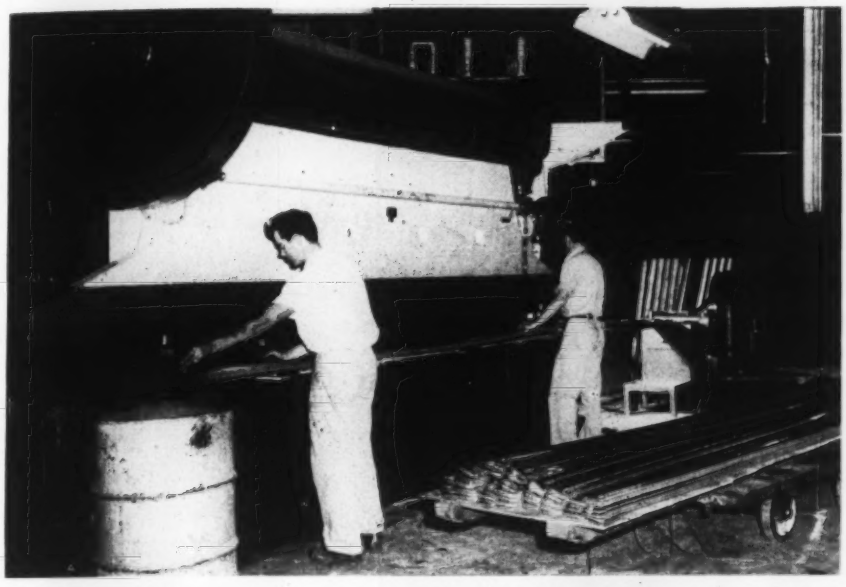
Of the 40 basic industry classifications, 38 reduced their frequency rates, and 28 reduced their severity rates. The accident frequency rate for employees in all industries submitting company reports, based on the number of disabling injuries per million man-hours, was 10.4 in 1949, a reduction of 12 per cent from the year before.

The communications industry again led all others by turning in the lowest employee accident frequency rate —2.14. Aircraft manufacturing was second with 4.25, followed by electrical equipment with 4.83 and steel with 4.96.

Although coal mining reduced the frequency of its accidents 10 per cent, it did not climb from the next to last position with a 41.48 rate. In terms of severity coal mining once more stayed at the bottom of the list: Its accident severity rate was 6.84, but it was a 10 per cent reduction.



FEMININE BOILERMAKER: Even the most hardboiled of the engineering professions—tool engineering—has been invaded by women. Shown above are three. One is a boilermaker. These women are full-fledged tool engineers and hold offices in their local chapters of the American Society of Tool Engineers. Sara E. Swan (left) has five years tool design experience with such companies as Eclipse Machine Division of Bendix Aviation Corp. and American-LaFrance Foamite Corp.; Idalyn Ruthe Cohen (center), the boilermaker, designs boilers at Babcock & Wilcox; and Virgina H. Martino (right) works for Kollmargen Optical Corp.



TEMCO COMBO: Texas Engineering & Mfg. Co., Dallas, developed a combination blank and form die that permits forming of an entire part in one operation as against 11 operations previously required. It goes on a Cincinnati press brake and enabled Temco to reduce fabrication time on aluminum spray rails for Lone Star Boat Co. by more than 80 per cent. Because the die is constructed sectionally, it can be used to form parts of eleven different lengths ranging from 84 inches to 195 inches. The spray rails are made from 4-inch 0.040 24SO coil stock into which a stiffening bead is formed

Handlers Get a Lift

Builders of material handling equipment hope 1950 sales will hit $1 billion

BUILDERS of such material handling equipment as industrial trucks, cranes, hoists and conveyors expect that 1950 will be a boom year.

In fact, the industry will be disappointed if sales this year do not hit $1 billion, up a third over 1949. An industry-wide poll shows that 48 per cent of all plants are spending as much or more for handling equipment as in 1949.

High Handling Costs—Members of the Material Handling Institute, Electrical Industrial Truck Association and the Monorail Manufacturers Asosciation, meeting at White Sulphur Springs, W. Va., June 15-16, were told that handling of materials comprises 20 to 30 per cent of the total cost of manufacturing a product. Usually, the manufacturer can show sufficient savings with improved handling methods to justify the purchase of new equipment. Seventy-five per cent of the plants checked in the poll wish to lower production costs; 49 per cent wish to increase production.

"Dig and Sell"—Do you know that too many sales executives today overlook the fact that it takes as much planning, direction and supervision, with the necessary tools given to the right people, to manufacture sales as it does to manufacture products? Members of the three handling groups were asked that question by their guest speaker, Walter W. Kemphert, vice president, Maurey Mfg. Co., Chicago. Increased marketing efficiency, he said, is the answer to the keener selling needed in this new era of "dig and sell."

Memo to Railroads: Buy Cars

The Association of American Railroads' Car Service Division is recommending heavy ordering of gondolas and flat cars in a report to member railroads.

The report is the result of an intensive study of the need for new cars made at the request of AAR's board of directors. The report is being forwarded to railroads, but its details probably will not be made public.

"How the railroads will obtain the new cars is their own business," says AAR. The report doesn't contain any recommendation for purchase or leasing plans. The study is being assembled on the basis of information gathered during conferences with the National Industrial Traffic League and with shippers, particularly steel manufacturers.

Gondola cars are used to ship sand, gravel, coal and steel; flat cars are generally used for steel, machinery and logs.

New Steel Mill for Colombia

Arthur G. McKee & Co., Cleveland, was awarded a contract for building a new steel plant near Belencito Boyaca, Colombia, according to news service dispatches from South America. McKee officials late last week said they had not been advised of the contract award, although they had been figuring on the job for Impresa Sideruageca Paz de Rio.

Fisher Brothers To Build

The fabulous Fisher brothers of Detroit, who amassed fortunes in the automobile body-building business, will erect a $10 million 11-story office building in Detroit at the corner of West Grand boulevard and Second, directly north of the General Motors building and east of the Fisher building. Construction will start Oct. 1, completion is scheduled for early 1951. To be known as the Brothers building, it is the first public office structure of its size to be erected in Detroit in 20 years.

The building will cover an area of 190 x 200 feet, will provide 300,000 square feet of office space and will have an adjoining garage for the use of the tenants. Completely air conditioned, the unit will be connected by underground concourse to the three other office buildings in Detroit's New Center area.

Another Chrysler Building

W. P. Chrysler Building Corp. will build a new fully air conditioned office building 32 stories high adjacent to the 77-story Chrysler building in New York. The building, to be known as the Chrysler Building East is scheduled for completion Sept. 30, 1951. It will cost about $10 million.

Studebaker Builds in East

Studebaker Corp. will construct a $5.5 million assembly plant at New Brunswick, N. J. Contracts have been let and building will be ready for operation about Mar. 1, 1951.

The plant will have 400,000 sq ft of floor space and capacity to assemble 85,000 passenger cars a year.

Servel Makes Air Conditioners

Servel Inc. is producing a single-unit heater and air conditioner for medium-size homes. The new unit has no moving parts in cooling or heating systems. A single thermostat controls both.

W. Paul Jones, Servel president, says a unit designed for a 6 to 9-room house will cost from $3200 to $5000, including installation.

Trouble in Tin Plate?

There will be if tariffs are reduced, Committee for Reciprocity Information told

YOU MAY eventually be drinking beer made in Milwaukee by a process originated in Germany, packed in American-made cans manufactured from British tin plate. The beer's all right, but the tin plate situation is not. So says W. H. Johnstone, Bethlehem Steel Co., who appeared as a spokesman for the American Iron & Steel Institute before the Committee for Reciprocity Information.

The committee has concluded hearings at which many interested manufacturers objected to inclusion of their products in the list from which concessions may be made when new reciprocal trade agreements are worked out this fall at Torquay, England. Tin plate is on the list.

No Help—A reduction in the present tin plate import tariff of 1 cent per pound would work against the national interest, says Mr. Johnstone, because foreign tin plate would flood into the American market and cut sales of domestic producers who have expanded their tin plate capacity by 50 per cent since the war. Already, the historical position of the U. S. as an exporter of tin plate is at an end, Mr. Johnstone says.

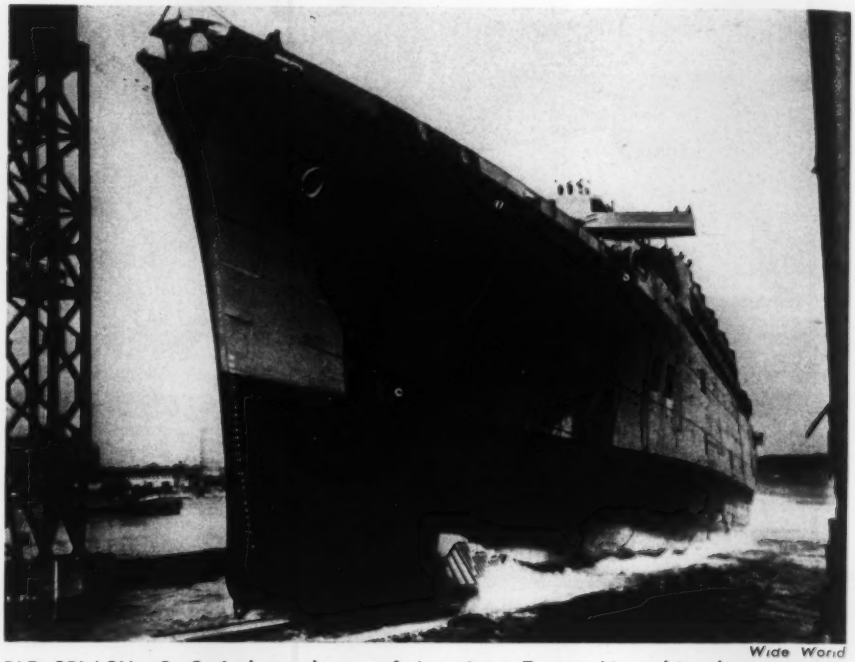
European and British tin plate plants have been rebuilt since the war with the latest American equipment, and now have capacity far in excess of their home needs. Many countries which have been obtaining tin plate from the United States—Chile, Argentina, Brazil, Mexico, Portugal, South Africa, Australia—are about to bring in new mills, many of latest American design, and will have more capacity than they can use at home.

Dollar Chasers—All these countries will be looking for export business. The European and British makers, at least, will probably try to develop a substantial market along our East and West Coasts, for their delivered costs in those areas are lower than American tin plate prices.

The old picture will be reversed; instead of being an important exporting country, with negligible imports, we will have to retire as an exporter in volume and become accustomed to receiving large imports.

Not Alarmed — Mr. Johnstone is less concerned over the outlook for imports of other iron and steel products. He looks for some imports of European and British shapes, bars, plates, sheets, wire rods and perhaps some others. Further reductions in tariffs on these other products "can mean, perhaps, nothing more than a small loss to the U. S. Treasury."

We can expect fair imports of certain specialties, such as hollow drill steel and certain types of tubing and tool steels. He also expects increasing imports of by-products, as benzol, sulphate of ammonia, creosote oil and the like. American beer will hold its own.



Wide World

BIG SPLASH: S. S. Independence of American Export Lines hits the water at Quincy, Mass. It is the biggest and fastest passenger liner built in any American shipyard in the past ten years. The 26,000-ton ship can make 25 knots and is the first liner of its size to be fully air conditioned

Foreign Rails Coming

Rerolling rails from abroad in "substantial" tonnages are expected to arrive at two Chicago mills in July. It will mark the first purchase of foreign material for rerolling by Calumet Steel Division, Borg-Warner Corp., and the Chicago Heights mill of Inland Steel Co.

The rails, now being loaded aboard ship, were obtained in France, Belgium and Luxemburg. While the exact price is not disclosed, it is said to be "considerably less" than the current domestic market.

After arrival in New Orleans the rails will either be transshipped by barge or brought north by rail. A rail rate competitive with that offered for barge transportation is being sought for the shipment.

Nelson Wins Tocco Contest

John Nelson, an engineer from Commercial Shearing & Stamping Co., Youngstown, won the first prize of $1000 in Ohio Crankshaft Co.'s national "Tocco Economy in Production Contest." Three metallurgists ended up as runners-up in the article-writing contest judged by editors of STEEL and other national business papers.

The winners, announced late last week by Tocco at a special luncheon in Cleveland were: Mr. Nelson, L. F. Graves, R. E. VanDeventer and George Bidigare. Mr. Graves, works metallurgist for Allis-Chalmers at LaPort, Ind., won the $500 award. Mr. VanDeventer, chief metallurgist, and Mr. Bidigare, plant metallurgist for Packard, split third place award of $250.

Mr. Nelson's contest-winning article was on silver alloy brazing with induction heating.

Autos Take One Fifth of Steel

The great American urge to have a good automobile has sent slightly more than one fifth of all finished steel produced in the nation's mills this year to the automotive industry.

In the first four months of 1950, the automotive industry received 4,620,822 net tons of finished steel from mills. That was 21.3 per cent of the total output of 22,119,319 tons, the American Iron & Steel Institute reports.

Next largest consumer is the construction and maintenance industry. It took 2,557,580 tons, or 11.8 per cent of the total shipments from mills in the first four months of the year.

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National Boosts Capacity

The steel producer will spend $25 million or more to up ingot output by 500,000 tons yearly

NATIONAL Steel Corp. will increase its ingot capacity by 500,000 tons per year by expanding blast furnace, coke and open-hearth facilities. The program will cost between $25 million and $30 million.

The present ingot capacity of National Steel, fifth largest steel company in the U. S., is 4.5 million tons a year.

More Pig Iron—Principal feature of the program will be construction of a new blast furnace with a capacity of 40,000 tons of pig iron per month at a plant of Great Lakes Steel Corp., a division of National Steel. The new furnace will be an addition to Great Lakes' present blast furnace plant of three furnaces on Zug Island in the Detroit river near Detroit. The coke plant at the same place also will be expanded.

Added pig iron capacity will make possible an increase in steel production at Great Lakes' Ecorse, Mich., plant. An open-hearth furnace at Ecorse will be enlarged to a capacity of 500 tons per heat.

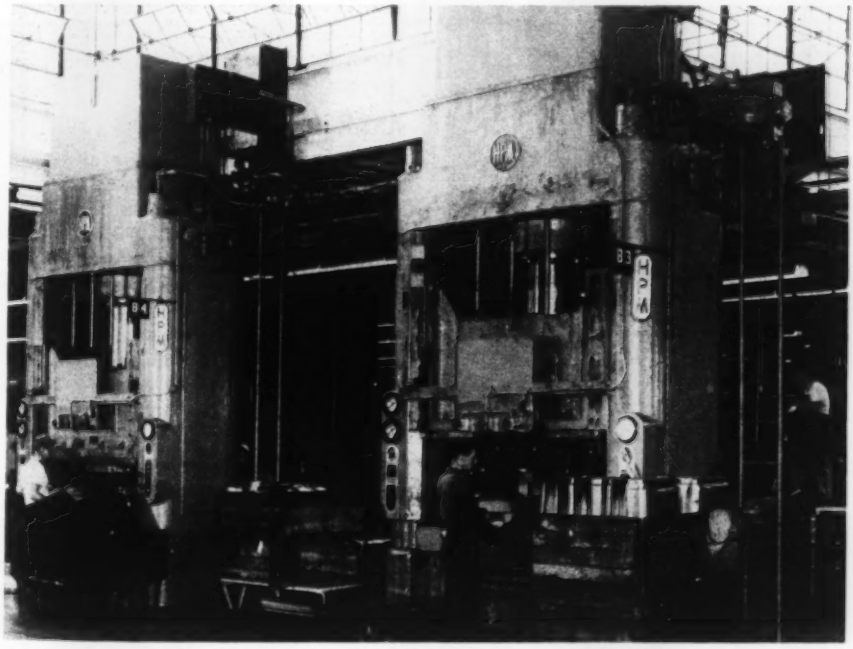
In West Virginia, Too—The expansion program also includes the rebuilding and enlargement of existing open hearths at the Weirton, W. Va., plant of Weirton Steel Co., another division of National Steel.

The Great Lakes blast furnace should be operating by Jan. 1, 1952. Construction will start soon.

Allegheny Getting 3 New Mills

Allegheny Ludlum Steel Corp., Pittsburgh, placed orders with United Engineering & Foundry Co., Pittsburgh, for a single stand 56-inch cold-reversing mill and two 30-inch cold-reversing mills for a $23.6 million plant improvement program at the West Leechburg and Brackenridge, Pa., plants. The program also includes replacing the 36-inch hot-strip mill with a 56-inch hot-strip mill, contract for which has not yet been placed.

Initial operations got under way last week on experimental basis at Brackenridge, on a unique combination blast furnace-cupola melting unit that will serve the twofold purpose of utilizing low grade light scrap for production of open-hearth hot-metal charge and for smelting New York state high titanium ores. The iron from this latter operation will be utilized in open-hearth operations and resultant titanium slag shipped back to National Lead Co. for refinement into titanium matte and returned to Allegheny for further refining into pure titanium or its alloys.



IRONS OUT PROBLEMS: Nineteen Hundred Corp., St. Joseph, Mich., manufacturer of washing machines and ironers, spent over $250,000 for seven HPM hydraulic sheet metal drawing presses, manufactured by Hydraulic Press Mfg. Co., Mt. Gilead, O. The new presses (only two of which are shown here) are of the 300 and 400-ton single action type. Two 400-ton double action presses were included

Youngstown Expands

Four open hearths, roll shop and finishing facilities to be built at Indiana Harbor

FOUR new open-hearth furnaces will be built by Youngstown Sheet & Tube Co. at its Indiana Harbor Works, East Chicago, Ind. The furnaces will produce between 550,000 and 600,000 tons of ingots annually.

After these furnaces are in operation, Sheet & Tube will discontinue its bessemer department at Indiana Harbor. Thus the net increase in the company's ingot capacity will be 250,000 to 300,000 tons a year.

The company will erect a new roll shop and finishing facilities for hot-rolled sheet and strip at its Indiana Harbor strip mill.

Youngstown's present ingot capacity is 4,082,000 tons a year. The additions just announced and other improvements already made will give the company about 4.5 million tons of ingot capacity.

Weirton Claims Ingot Record

Weirton Steel Co., National Steel Corp.'s subsidiary at Weirton, W. Va., announces a new production record for open-hearth steel. In May its 12 stationary furnaces turned out 208,467 tons of ingots. The best previous performance was in October, 1949, when 200,379 tons were produced.

Three 25-foot, six-inch blast furnaces turned out 124,375 tons of pig iron in the month, beating the old record also set last October.

Bethlehem Installs Furnace

In another phase of its program to expand western steel production, Bethlehem Pacific Coast Steel Corp., Los Angeles, completed installation of a new 75-ton electric steelmaking furnace.

The new furnace, largest in the west and one of the largest of its type, augments production of a 50-ton model installed two years ago. Of 3-phase, top charge design, the furnace is covered by a shell of 1⅛ inch thick steel plate, and measures 20 feet in diameter. Controls are hydraulic and are operated from a central control panel. Automatic electrical equipment adjusts three giant 20 inch electrodes.

Other units under construction or scheduled at Bethlehem Pacific's Los Angeles plant include a new heating furnace for the plant's 12 inch rolling mill, new mechanical handling equipment and a new mechanical cooling bed.

Squeeze on Continental

Additional canmaking facilities, slated for operation by late fall, being built in Florida

TO KEEP PACE with the rapidly expanding frozen juice industry, Continental Can Co. is building a new plant at Auburndale, Fla.

The plant will supplement manufacturing operations in Tampa, and is expected to be in operation by late fall. It will employ about 300 persons.

The one-story building will contain 120,000 square feet. It is located on a 20-acre site.

Continental also opened new plants in Pittsburgh and Milwaukee. Its new 700,000-square foot factory in Pittsburgh was built to consolidate operations in the Pittsburgh-Wheeling area and to be near major sources of tin plate and other essential supplies.

It turns out flat top and cone top beer cans, and oil, paint and grease cans, steel pails and drums, and crown caps.

The 1 million-square foot Milwaukee plant will be used in 1950 to manufacture beer cans and cans for Wisconsin food processors. The firm may get a new plant on Terminal Island outside Los Angeles. It filed applications to lease two areas there for construction of a metal container warehouse and factory. The new project will cost about $2 million.

Westinghouse in Birmingham

Westinghouse Electric Corp. will build a plant in Birmingham to be operated by the company's manufacturing and repair department. It will provide extensive overhaul and repair facilities to serve customers in all parts of Alabama.

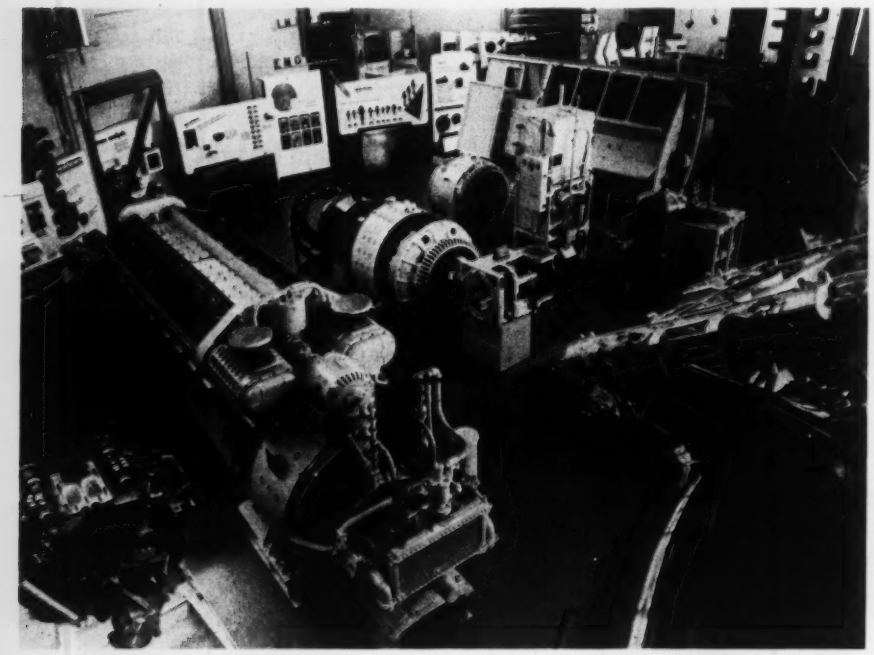
Construction has already begun on the plant. It will consist of two one-story brick and steel buildings with about 50,000 square feet of floor space. Buildings should be completed by June, 1951.

Centrifex Buys 3-Story Factory

Centrifex Corp., Cleveland, bought a three-story factory on Payne avenue, Randall T. Elliott, president, announced.

A pioneer in vapor entrainment separation, the firm specializes in high-efficiency internal and line purifying equipment based on the centrifuge principle. The newly acquired building contains 27,000 square feet. It will be used primarily for light manufacturing and assembly of the company's line of internal and line vapor separator and purifying equipment.

Besides housing manufacturing operations, the new Centrifex plant will contain general offices.



VIEW FROM THE NOSE: This view from the nose of a General Motors diesel locomotive provides a partial view of the new permanent exhibit, "Blue Print for Better Locomotives," which was opened at the La Grange, Ill., plant of the Electro-Motive Division. The exhibit features cutaway working models showing different phases of diesel locomotive manufacture and highlights the continuing progress in standardized design and manufacturing techniques. Electro-Motive attained a record production rate of 200 locomotives a month in March

Zenith Radio Gets Building

Zenith Radio Corp. bought a two-story building from Louis Hanson Furniture Co. on Chicago's northwest side. It will be used for manufacturing radio and television components.

The building contains 185,000 square feet; 300,000 square feet are available for future expansion.

Michigan Abrasive Buys Plant

Michigan Abrasive Co., Detroit, bought the former Michigan Tool Co. plant at Eight Mile road and Groesbeck highway in Detroit.

The plant, which was constructed in 1942, has 65,000 square feet of floor space. Michigan Abrasive will continue to occupy its Bellevue avenue plant. The company will manufacture its newly developed resin coated abrasives with special machinery.

Ferro Enamel Starting Expansion

A chain reaction started the $1 million expansion program that Ferro Enamel Corp., Cleveland, is authorizing for a number of its plants:

The housing boom stimulated a demand for porcelain enameled plumbing ware, tile and household appliances. The demand sparked an upward trend in sales and earnings for Ferro. Every one of its divisions participated in the improvement, so every month this year Ferro operated at a higher level than it did in any similar month in the past. Seeing the handwriting on the wall, the Ferro directors voted the funds.

AS&R Reorganizes Sales

American Smelting & Refining Co. reorganized its sales and distribution plans for Continuous-Cast Products of brass and bronze. The products were formerly distributed by Ampco Metal Inc., Milwaukee, as general sales agent.

John L. Kimberley was named sales manager; he will direct the new program from the Perth Amboy, N. J., plant. Donald S. Goebel, who handled the Asarco Continuous-Cast alloys when they were distributed by Ampco joined American Smelting & Refining and will make his headquarters at the Whiting, Ind., plant. Company representatives will handle the sales for 37 states in the eastern, midwestern, southern and southwestern areas. The western area will be handled by Kingwell Bros. Ltd., San Francisco.

The Asarco process for continuous casting makes available a wide range of alloys in a form equivalent, in dimension, uniformity and soundness to long mill rods, tubes and shapes.

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Lockheed Set for Jets

The California aircraft builder will spend $5 million to expand its facilities

LOCKHEED Aircraft Corp. is buying machinery so big that it is setting up the equipment first and building a new factory around it.

Lockheed is spending $5 million—$2.5 million of it this year — to expand facilities to meet requirements of the jet age. Construction of a 33,000 square foot factory in Burbank, Calif., is under way, but it will not be completed until most of the giant machinery is finally installed.

Hall of Giants—Among the special machines to be installed in the Burbank plant is an 8000-ton Birdsboro hydraulic press that will tower 36 feet above the factory floor although its base will be embedded 12 feet into the building's foundation. Also record breakers for the aircraft industry will be a 200-ton Hufford stretch press and a 20-ton Ceco stamp press.

Besides the three forming machines, the building will contain the first top-riding underslung crane to be installed on the West Coast, a 70-foot long milling machine, a large boring mill, a heat treating oven and other accessory equipment large enough to handle the bigger, heavier parts from the other new machines.

Jet Air Age—High performance jet aircraft design calls for fewer but larger individual parts, with heavier sections and new tougher metals demanded to meet stresses set up by higher speeds. Lockheed's new equipment will permit forming and processing of up to half-inch thick aluminum alloy sheets measuring 30 feet by 10 feet.

Since normal reserves for depreciation could not cover the cost of the new equipment, Lockheed has supplemented these funds from profits.

Poor To Build Road Equipment

Poor & Co., Chicago, manufacturer of railway equipment is entering the highway machinery field.

The company bought almost all the common stock of Pioneer Engineering Works Inc., Minneapolis, for an undisclosed sum of cash and proceeds from a $2 million debenture loan.

Pioneer makes heavy machinery for materials handling, crushers, conveyors and other highway construction machines as well as some mining machinery. Its annual earnings have been running to between $300,000 and $500,000. Earnings of Poor for 1949 were slightly over $1 million.

Mine Safety Dedicates Lab

A research laboratory for the development of safety equipment for all industries was dedicated in Pittsburgh by Mine Safety Appliances Co. It was dedicated to the memory of John T. Ryan, international pioneer in the field of industrial and mine safety. He was co-founder of the Mine Safety company.

Facilities in the laboratory will be used for developing equipment and devices to combat hazards of all types. Equipment for use in air pollution and atomic energy are among the projects planned in the laboratory.

Atlantic Steel Holds Open House

Atlantic Steel Co. showed both how it makes its steel and how its customers use the metal when it combined an open house with a Southern Agriculture Implement Show in Atlanta.

Visitors watched steel being made at Atlantic's three 72-ton open hearths and saw farm equipment exhibits of 35 southern manufacturers.

Atlantic sells its products in Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia.

Advertisers Slate Conference

The National Industrial Advertisers Association will hold its 28th annual conference in Los Angeles, June 29-July 1. ECA Administrator Paul G. Hoffman will be a guest speaker.

Speakers reviewing the economic outlook will include George O. Hays, president of Penton Publishing Co., publisher of STEEL.

A. O. Smith Gets Big Order

But the major share of a 1300-mile pipe order will be handled by the Texas plant

A. O. SMITH Corp., Milwaukee, will fabricate the pipe for the 1331-mile natural gas pipeline project of the Texas-Illinois Natural Gas Pipeline Co., Chicago, subsidiary of Peoples Gas Light & Coke Co.

The major share of the order for 30-inch pipe will be fabricated at the new A. O. Smith Corp. of Texas pipe mill plant in Houston. The plant is nearing completion and is scheduled for operation Aug. 1. It is owned jointly by A. O. Smith and Sheffield Steel Corp., Houston. Sheffield is a subsidiary of Armco Steel Corp. The minor share of the order will be filled in Smith's Milwaukee pipe mill. It will take about a year to fill the order. The aggregate cost of the pipe is estimated at about $45 million.

Smith's Milwaukee plant can only make pipe up to 26 inches. The Texas firm can handle the 30-inch stuff. About 1300 miles of pipe will be required. About 963 miles of the pipe will be 30 inches in diameter; the remainder will be in sizes between 20 and 26 inches.

Wide World

NO CINCH: The lone police officer who must keep a lookout over these acres of pipe in a pile near Stokesdale, N. C. has no lead pipe cinch. The stockpile is one of a series dumped by contractors for the Transcontinental Gas Pipeline Corp.'s 1800-mile Texas to New Jersey project

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

A pattern set by former Treasury Secretary Henry Morgenthau is responsible for badly needed tax reform. Despite the pattern the Commerce Department is rooting for reforms

THE WAY business and industry look at it, the tax policy procedure of the Truman administration is short sighted and unsatisfactory. Business observers in Washington generally agree that a reform in the procedure is much more desirable than any of the changes involved in the President's reorganization plans.

NEA

COMMERCE SECRETARY SAWYER
. . . liberalize depreciation

This is the setup: The Treasury Department is assigned the tax policy, and it has the exclusive right to submit the administration's tax program to Congress. That seems to be natural because the department is primarily concerned with raising the maximum amount of money for the Fair Deal program. But the result is that badly needed tax reforms are omitted from the Treasury's annual presentation because they might result in an immediate loss of a few million dollars in cash collections even though they would increase the future ability of business to pay taxes.

Pattern by Morgenthau—The idea of the Treasury Department setting the tax policy (it makes about as much sense as a firm's treasurer being the sole arbiter of company policy) stems from the days of Henry Morgenthau. He set a pattern in early Roosevelt days when he was upheld in his contention that the Treasury Department should have full responsibility for the administration's tax policies.

Despite the pattern, other administration units are rooting for tax reforms to aid business. But they have no authority, and their arguments get them nowhere with the Treasury. Here's an example of the cavalier treatment the Treasury Department afforded the Commerce Department:

All for Naught—Last year Commerce Secretary Charles Sawyer traveled 15,000 miles and saw over 3000 business men and others to study business trends and to find out what businessmen thought they needed from government. Earlier this year the secretary reported business men wanted: Elimination of wartime excise taxes and double taxation on corporate earnings, liberalization of depreciation allowances and a liberalization of corporate income tax structure generally to permit small firms to retain a larger share of earnings as working capital.

Secretary Sawyer might have saved his labor and pains. When Treasury Secretary John W. Snyder submitted his tax proposals to the Ways & Means Committee in February, he either ignored Mr. Sawyer's recommendations entirely or attached nullifying provisions to them.

The recommendations for accelerated depreciation and for elimination of double taxation were not even mentioned.

To Say the Least—All that has been discouraging to business. The Ways & Means Committee's decision this year to consider only those tax revisions that the administration suggested means that another year will lapse before another opportunity to do anything about depreciation appears.

Ironically, while the Treasury Department is the administration's expert on taxation, for Congress it occupies no such high place. Rep. Noah Mason (Rep., Ill.), influential Ways & Means member, told STEEL: "We threw out more than three-quarters of the Treasury's proposals this year, including its four major ones."

No Headway—An answer to the problem of deciding tax policy could be found in an interdepartmental committee: Mr. Snyder could be chairman, but it should have others with equal voices, particularly the Commerce secretary, the chairman of the Council of Economic Advisers and the chairman of the Federal Reserve Board. The White House has considered the idea, but it hasn't made any appreciable headway.

NEA

TREASURY SECRETARY SNYDER
. . . sole spokesman on tax policy

Small Business Booklets

The Commerce Department's Small Business Division has increased its production of booklets and reports of interest to small businessmen.

Titles of pamphlets made available in the past few months are: "Your Rights of Review when the Government Questions your Income Tax Return," "The Meanings, Purposes and Uses of Discounts and Invoice Terms," "Patents and Government Patent Services," and "Copyrights and Copyright Office Services." Titles of similar reports issued in 1948 and 1949 are "Corporation Life Insurance," "The Small Businessman and His Financial Statements," "Small Business and Government Licenses," "Small Business and Trade-Marks," "Business Life Insurance," and "How Wholesalers Assist Manufacturers." Copies of all are available at Commerce Department field offices throughout the country.

The Small Business Division is ready to write comprehensive treatises on subjects suggested to it by small

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firms. The subjects, of course, must be of general interest from the point of view of business management.

Tillage To Be Studied in Alabama

Designers and manufacturers of agricultural equipment will be interested in an intensified study of tillage and tillage machinery to be conducted at the United States Tillage Laboratory, Auburn, Ala. It is the only establishment of its kind in the world.

Dr. E. G. McKibben, international authority on tillage mechanics, will be in charge of investigations on "tillage methods and machines, tire traction, soil compaction or other effects of machines on soil structure and resulting yields of crops."

I. F. Reed will direct that part of the work concerned with oil crop equipment. The laboratory is operated by the Bureau of Plant Industry, Soils and Agricultural Engineering of the U. S. Department of Agriculture.

Booklet Out on Radioisotopes

Expecting that the uses of radioisotopes by industry will grow rapidly, the Atomic Energy Commission prepared a 147-page book discussing the hazards to be controlled in dealing with radioactive materials. It summarizes all existing information on behavior of radioactive dusts, fumes and mists.

You can get "Handbook of Aerosols," for 60 cents from the Superintendent of Documents, Government Printing Office, Washington 25. Dr. Merrill Eisenbud, of the Atomic Energy Commission thinks increasing industrial use of isotopes is sure to materialize when more men properly trained in this field become available.

Brochure on Corrosion Is Free

If you're interested in corrosion research, write to the Materials Branch, Office of Naval Research, Navy Department, Washington 25, for free copies of a brochure called "Forum on Corrosion Research."

The book digests papers by 16 scientists that were submitted in a closed meeting of government metallurgists in Washington last November. The authors reported findings up to that time from government-financed research into the fundamental and contributory causes of corrosion, and of methods to nullify these causes in whole or in part. In general, the subject matter of the brochure will appeal to scientists rather than to laymen. An outstanding paper digested in the book is by Dr. P. Van Rysselberghe, University of Oregon, on the use of the new Polarograph for measuring oxygen consumption; the paper shows this instrument to be a highly useful tool in measuring rates of corrosion, studying the mechanism of corrosion, and in determining how inhibitors work. Copies of the brochure will be ready for distribution late in August.

NEA

INQUISITOR: One question that Pennsylvania Democrat Frank Buchanan's lobbying questionnaire raises is an old one: Just what is lobbying—where does the right of petition end and lobbying begin? The chairman of the House Select Committee on Lobbying stirred up a hornets' nest (STEEL, June 12, p. 71, June 19, p. 57) when he asked 166 companies about "lobbying activities." While the legality of his questionnaire was being decided in court last week, the question being raised was: Who's going to get stung —the 166 companies or him

Weapons Evaluation Director

Dr. Howard P. Robertson was appointed research director for the Weapons Systems Evaluation Group, Department of Defense.

He is on leave for this purpose as professor of mathematical physics, California Institute of Technology, Pasadena, Calif. He succeeds Dr. Philip M. Morse, who returned to his duties as professor of physics at the Massachusetts Institute of Technology.

New England Engineer Named

Col. Henry J. Woodbury was appointed New England Division Engineer, Army Engineers, with headquarters at Boston. He had been Western Ocean Division Engineer, at Sausalito, Calif.; the Western Ocean Division was abolished and its functions merged into the South Pacific Division, Oakland, Calif.

Richards: New Special Assistant

Charles A. Richards is the new acting special assistant for small business to Economic Cooperation Administrator Paul G. Hoffman. Mr. Richards succeeds Bert H. White, organizer of ECA's small business program.

NEA

LOTS OF PUSH: This North American B-45 is undergoing accelerated flight tests so hundreds of flight hours can be piled on the jet engines in the shortest time under known service conditions. The flight test division of General Electric's General Engineering & Consulting Laboratory will operate the Air Force bomber to meet the needs of the Aircraft Gas Turbine Division which manufactures J-47 engines for USAF planes at plants in Lynn, Mass., and Lockland, O. The light bomber's four engines supply 20,800 pounds of thrust or driving force

Great Britain's Yorkshire Carries On

The county in northeastern England is one of the most important metalworking areas of Europe. Will its 150-year old industry ward off nationalization?

"IN YORKSHIRE we can make nearly anything and we can survive nearly anything, even nationalization." That's the claim of a metalworking man from the county that is one of the most important industrial areas in Great Britain and Europe.

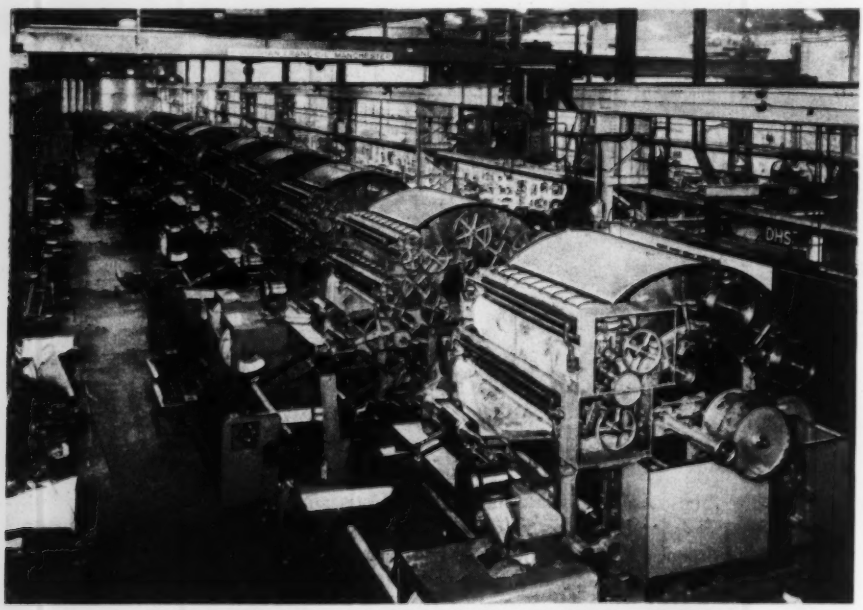
Yorkshire, in northeast England, is divided into three regions: North, East and West Riding. Industrialization is heaviest in East and West Riding where 230,000 people are employed by metalworking companies. The main centers of production are Sheffield, Barnsley, Doncaster, Leeds, Brighouse, Huddersfield, Halifax, Wakefield, Dewsbury, Bradford, Keighley in the West Riding; Hull and York in the East Riding.

Because of Sheep—Metalworking got started because of sheep. Wool started a textile industry. Cloth makers needed machinery, so a textile equipment industry started more than a century ago. It still flourishes, although the Yorkshire sheep don't. Yorkshiremen import most of their raw wool now. Development of the now-nationalized coal fields in the southern part of the county gave another impetus to metalworking. Besides giving the area cheap fuel for power, coal gave the start to a still-flourishing industry making mining and excavating equipment. In the mid-nineteenth century when iron ore deposits were developed around Cleveland in Yorkshire, coal came in handy for a new steel industry.

Steelmaking centered around Sheffield. Production there now is booming despite threats of public ownership. Today the industry has outgrown the Cleveland ore field and must import, mainly from Sweden and Spain. Emphasis is on output of special and alloy steels, and of wire and strip steel. Aside from the steel companies, most Sheffield firms are small or medium sized. They make locomotives, freight cars, heavy trucks, construction equipment, small machine tools, circular and band saws, crankshafts, magnets and cutlery.

Men Wanted — There's a labor shortage in Leeds, center of the most diversified metalworking activity in Yorkshire. Industrialists would like government help for that. Major manufacturers of the Leeds area turn out locomotives, diesel engines, printing machinery, textile machinery, copper tubing and tractors. David Brown Tractors Ltd. has one plant in the region. The company now is the third largest maker on the islands, but it wasn't in 1946 when its output was only one-fifth of what it is today. Brown makes 10,000 tractors a year, plus farm implements.

Exports account for half or more of the business of many companies in Leeds and other parts of Yorkshire. Fairbairn, Lawson, Combe, Barbour Ltd., another Leeds company, sells 90 per cent of its output abroad. It makes machinery to process jute, flax and other fibers. Thomas Smith & Sons Ltd., still another firm with a plant at Leeds, sells half of its cranes and excavators abroad.



FAIRBORN, LAWSON, COMBE, BARBOUR LTD. OF LEEDS
. . . 90 per cent of its hard fiber machinery sold abroad

SMITH & SONS LTD.
. . . cranes and excavators

Old-Timer — Newton Chambers & Co. Ltd. has survived the industrial ups and downs of Yorkshire since 1793. In an industrial community of Thorncliffe, near Sheffield, its plants occupy 160 acres where 4000 are employed. George Newton and Thomas Chambers started the ball rolling 157 years ago when they expanded their small foundry into an iron and steel works. They exploited their own coal and iron ore mines. When the iron ore properties gave out many years ago, the company switched to other activities. In 1947 when a nationalization act deprived it of its coal mining and processing business, it once more had to leap spryly to other fields. Today it makes excavators and dumpers, chemicals, heavy plant equipment for gas works, steel mills and chemical plants and heating and cooking appliances for the home.

Paternalism—To forestall further nationalization, the company has started its own social program for the 20,000 people directly or indirectly dependent upon its earning power. That includes a school for new employees with courses in the history of the company, as well as in job training. The company also has a large recreational program including sports and drama.

The question is: Can this 157-year old Yorkshire firm and others like it keep nationalization at arms length with cricket and Shakespeare?

Industry Missing A Bet?

OTS's Green thinks it might be in failing to protect patents in foreign lands

IS INDUSTRY missing a bet in failing to bear the expense of obtaining foreign patents on government-owned patents? In some cases the answer is yes, say government officials.

At Stake—Foreign nationals may use the inventions, even patent them if they are not patented abroad. Government officials say if patents are taken out in foreign countries by our government, the cost should be borne by interested industries. Why? Government men say manufacturers, more than the government, stand to gain from foreign patent protection. Without the protection, American manufacturers operating under nonexclusive, royalty-free, government-owned patents may lose foreign markets eventually.

Right now foreign patent applications may be made on many government-owned inventions—if the industries concerned show an interest. Inventions involved include: Fuels, instruments, electrical equipment, electronics, machinery, metals, minerals, aeronautics, etc.

The Office of Technical Services of the Commerce Department has the details wrapped up in "F. P. List VII." OTS is the agency that handles applications for foreign patents on government-owned patents. The usual cost is $200 per invention per country.

Rules of the Game—John C. Green, director of OTS, says his agency can only act for whole industries in applying for foreign patents. It cannot enter into agreements to give any exclusive foreign rights to individual manufacturers. Under the law it must act for the public as a whole. That means any American manufacturer can obtain a nonexclusive, royalty-free right under any foreign patent held by the government.

A Loser—The condition in many cases had not been acceptable to manufacturers. An example: The inability of the government to grant exclusive foreign rights to any individual company prevented the government from securing the aid of the radio manufacturers in applying for foreign patent protection on many inventions that the Army Signal Corps considers of vital importance to the future development of radio, telecommunications and electronics.

Mr. Green hopes industrialists from now on will realize that even though they can't get exclusive rights under government-owned foreign patents they'll get protection against foreign competition built up on American processes.

Tool Handbook for England

Arrangements were made for publication of the *Tool Engineer's Handbook* in England by McGraw-Hill Book Co.'s London affiliate. Publication in England will make it possible for British industries to buy copies of the handbook with "sterling" instead of dollars.

New Officers for GAMA

New officers of Gas Appliance Manufacturers Association are: President, Frederic O. Hess, president, Selas Corp. of America; first vice president Louis Ruthenburg, chairman of the board, Servel Inc.; and second vice president, A. B. Ritzenthaler, vice president, Tappan Stove Co. Elected at the 15th annual meeting of GAMA at White Sulphur Springs, W. Va., they'll take office in October.

Safety for Scrap Industry

The Institute of Scrap Iron & Steel Inc., Washington, started a safety program to reduce worker injuries among its member companies. The program consists of promotional material, informative bulletins for management and working plans. It is designed especially to meet the specific hazards of the scrap industry.

Land of Steady Habits

Half a century means a lot of things to a lot of people this month of anniversaries:

Farrel-Birmingham Co. Inc., Ansonia, Conn., had five of its employees join a select group that includes ten active and five retired employees, all with 50-year service records. Appropriate comment on the occasion came from Carl F. Schnuck, one of the awardees who is director of engineering for the company. Said he: "This all seems to uphold the adage that 'Connecticut is the land of steady habits.'"

Browing Crane & Shovel Co., Cleveland, is holding a number of events this year in conjunction with its 50th anniversary. Not long ago it introduced its latest model locomotive crane. Known as the Torqflo Locomotive Crane, it operates with torque converter power similar in operation to the automatic transmission in automobiles.

Beaver Pipe Tools Inc., Warren, O., is celebrating an anniversary after 50 years of service to the plumbing and heating trade. Beaver is still housed in the building where the first Packard was built by Packard Brothers, then of Warren.

Reid Brothers Co. Inc., Beverly, Mass., has been in business 50 years, too. The manufacturer of the Reid Grinder starter a new division after the war, Post Machinery Co.

Wide World

PARLEY ABOUT PARLAY: In 50 years of business W. C. Coleman (left) president of Coleman Co. Inc., Wichita, Kans., parlayed 16 sample lamps into a company doing a gross business of $24 million yearly. Here he compares today's gasoline pressure lamp with the Efficiency Lamp that launched the company. Hiram W. Strong, chief consulting engineer of the company, holds the old-fashioned lamp

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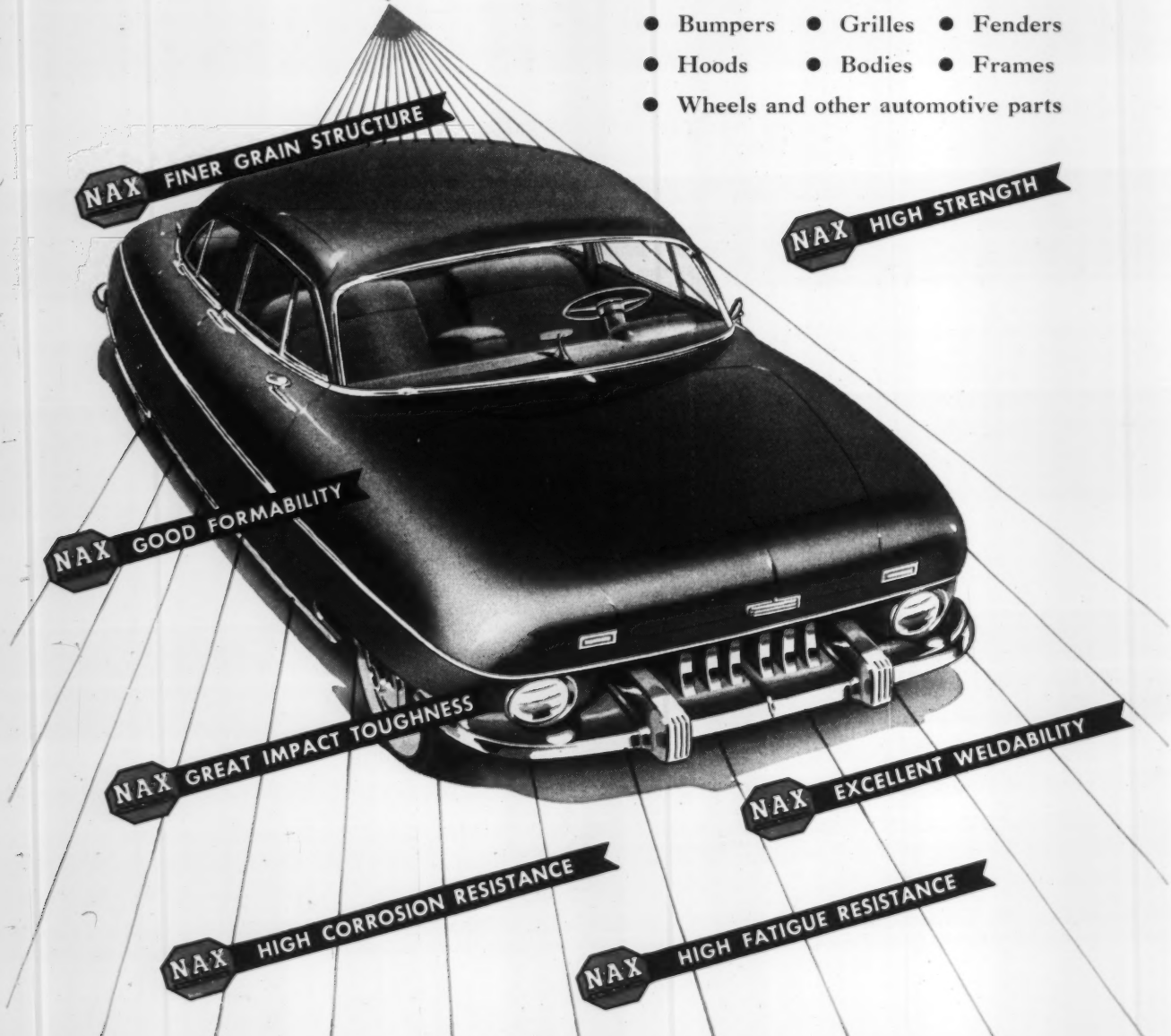
- Frames
- Wheels and other automotive parts



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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Station wagon output has practically quadrupled since 1941, with last year's total about 120,000. The substitution of steel for wood in the body spurs sales

DETROIT

METEORIC rise in production of station wagon passenger car models in the postwar years may not be realized generally. Statistics reveal output has practically quadrupled since 1941, with last year's total approximating 120,000.

Popularity of station wagons is a typical U. S. phenomenon and reflects the near-universal desire to pile a gang of people and a mountain of luggage into the car and hit the road for the wide open spaces. Even the fact that this body type carries a price premium of $200-$500 over the expensive convertible style has not prevented increasing numbers of buyers from making it their choice.

Steel Is the Lure—A principal factor tending to lure more buyers has been the substitution of steel for wood in the body structure. Originally, the station wagon body was practically all wood, and its assembly was a laborious procedure, requiring much hand work. Careful finishing also was necessary, with several coats of varnish to bring out the detail of the wood grain. This had its drawbacks, for even the best varnish did not seem to stand up much more than six months, and owners of station wagons had to figure on a complete refinishing job about twice a year.

Perfection of methods to transfer simulated wood grain to steel panels, interior trim of both plywood and fiberboard types, and to leather-type upholstery materials has improved greatly the permanence of station wagon finishes.

Willys Tried It—In 1946 Willys-Overland introduced the all-steel station wagon and it proved a hot number. That year 6533 were built and the following year over five times as many—33,336, an alltime record for station wagon manufacture and more than the entire industry built in 1941. Willys output dropped in 1948 to 22,374, jumped to 29,295 last year and was off again this year to 4897 in the first four months because of transfer of body-building operations from Briggs in Detroit to the Toledo, O., plant.

In any event, Willys the other day celebrated completion of station wagon No. 100,000, representing factory sales volume of better than $160 million. This year the company is allocating more than 60 per cent of its production to station wagons. They come with either 4 or 6-cylinder engines, 2 or 4-wheel drives, chassis and engines paralleling those of other types in the company's line of utility vehicles.

Chrysler Cashes In—All four Chrysler divisions now offer station wagons, as well as several other types of all-purpose vehicles with slight variations. Thus, Plymouth builds a suburban all-steel body with the carrying capacity of a station wagon but without the simulated-wood decorative treatment. De Soto has a 6-passenger carryall, with folding rear seat to provide level storage platform behind the rear seat, a 9-passenger suburban with luggage rack on the roof and a sports-type station wagon. Chrysler division has a station wagon, fully weather-stripped and built with yacht-like craftsmanship, in addition to a traveler model which converts from a 6-passenger sedan to a 3-passenger cargo carrier.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	609,882	445,092
February	505,593	443,734
March	610,678	543,711
April	585,705	569,728
Four months	2,311,858	2,002,265
May	702,000*	508,101
June		523,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
June 3	146,825	98,087
June 10	200,515	139,540
June 17	203,689	146,056
June 24	205,000	153,001

Estimates by Ward's Automotive Reports

* Preliminary.

Chrysler divisions stepped up production of these special body types sharply last year to nearly 25,000 compared with only 7515 the year before. This year a further boost is likely, inasmuch as new models have been added to the group. Some are of the wood-on-steel type, the brilliantly finished ash trim serving as nothing more than decoration. Chrysler has a wood products division at Helena, Ark., which furnishes these sections.

A Good Slice—In the General Motors line, Chevrolet historically has led in station wagon production, last year turning out better than 22,000, or about 19 per cent of the industry total. This figure was up sharply from the 4790 built in 1941. The Chevrolet body, by Fisher at its Euclid, O., plant, is now practically all steel, except for the interior trim where wood, plywood, and wood-grained fiberboard are used extensively for window sills, door panels, headers and the like. Pontiac's station wagon body is practically a duplicate of the Chevrolet, being made in the same plant. Assemblies last year were 4879, down sharply from the 9400 built in 1948 but well ahead of the 1714 turned out in 1941. Switch from wood to steel is calculated to boost this year's showing for both Pontiac and Chevrolet in the station wagon field.

Buick's more elaborate "Estate Wagon," in which a considerable amount of exterior wood is used, has been holding to a steady volume of around 2500 units for each of the past two years. Oldsmobile has done a little better with its station wagon, chalking up 2900 last year and 2700 in 1948. In 1941, Olds built only 700.

Ford to the Fore—Ford was far ahead of the field prewar, building nearly 17,000 station wagons or nearly three and one half times the Chevrolet volume. This pace has been maintained postwar, Ford supplying 22,200 last year and keeping step this year. Bodies are built at the company's Iron Mt., Mich., plant. Mercury also has been running off several thousand station wagon models yearly, and recently introduced a new two-door design, with mahogany-grained steel panels replacing former exterior plywood to increase rigidity. Outer panel of the tailgate also has been changed to steel. Doors and quarter panels are lined with mahogany-grained gypsum board, headlining is of a fine grain vinyl. Other improvements include the use of lin-

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oleum as the lining for the tailgate panel, on the center seat back and seat cushion bottom.

A Packard Hybrid—Packard's version of the station wagon is a hybrid type of vehicle and as the name "Station Sedan" indicates, it is a cross between a large sedan and a station wagon. The model has not proved too popular, only 472 being built last year, against 3266 in 1948.

The Crosley station wagon is leader in its line of small-size vehicles, 1948 seeing production of about 23,500. Output dropped sharply to 4750 last year.

At one time Hudson built station wagons, but has not resumed this activity since the war.

Rambler Offers Utility Unit

Latest candidate for the suburban utility-vehicle market is the station wagon model of the Nash Rambler, announced last week to sell at a factory price of $1808 with full custom accessories included in this figure, making it the lowest priced wagon in the field, excepting Crosley, of course. Carrying identical engine, basic chassis dimensions and price with the convertible model of the Rambler, introduced several months ago, the station wagon is a 5-passenger two-door body, providing luggage space 4 feet wide, 2 feet 8 inches high and 6 feet 5 inches long with the rear seat folded into the floor and tailgate lowered. Seat cushion upholstery can be quickly unhooked for cleaning. Body and frame are welded into a strong, single unit, and no wood is involved in the construction.

The Rambler station wagon has been in limited production for several weeks and dealers are being stocked as rapidly as possible. Included in its price are heater, direction signals, foam rubber seat cushions, chrome wheel disks, electric clock, radio and other minor deluxe features. The design follows the Nash policy of bringing out custom versions of the Rambler series first and following them up at a later date with stripped-down standard models, if it appears desirable. A hard-top convertible and conventional sedan are the next Rambler types scheduled for production.

GM May Begin Changeover Nov. 1

Likely date for the start of changeovers to 1951 models in General Motors Divisions is Nov. 1. Fisher Body has issued to suppliers its 15th parts release for current models which covers production requirements for September. Thus there may be a 16th release for October production, setting a new record on parts-buying for any one model series. Quantities specified show little deviation from present levels, indicating that car output will be strong through the summer.

Chevvy Aims at Ford Marks

Chevrolet is putting on steam, hoping it will be able to break the all-time peak figures set by Ford back in 1925 and 1929. In October, 1925, Ford built 212,988 cars and trucks, in August, 1929, the total was 201,340, these being the only times assemblies topped the 200,000 mark. Peak year at Ford was 1923, when output was 1,923,360. Conceivably this figure could be topped when the 1950 record is written.

As of June 30, Ford will have completed 990,000 units, and if it is decided to work July 3, the 1,000,000th vehicle will be off the lines. Duplicating that in the second half would break the 1923 peak. Some interruption will occur come the changeover of Lincoln, Mercury and Ford models to 1951 designs. Consensus now is that Ford will carry through its present body lines another year, the third incidentally, confining alterations to grilles, moldings and other decorative touches. Revisions in Lincoln and Mercury bodies will be more pronounced.

Meanwhile Ford will have a new hard-top convertible to broaden its present line, this being scheduled for announcement any day now. Reportedly, to be called the Crestline, it will feature increased glass area inside and rear windows, although the center post between the doors will be retained. Steel roof panel will be covered with a colored vinyl plastic material, cemented in place and calculated to provide a distinctive appearance in contrast to the conventional lustrous steel roof.

Auto Executives Get Physicals

Packard has launched a program of voluntary physical examinations each year for about 700 members of its management staff. The checkups, for which no charge is made, are given in the main company hospital, with all results kept confidential. Any findings which indicate correction is necessary, or point to further examination or laboratory work beyond the facilities available, are discussed privately so the persons involved can make arrangements for treatment by their own physicians.

Top management executives of other large automotive companies regularly have physical examinations, going annually to clinics like that of the Mayo Bros. for expert diagnoses. Some are compulsory, some optional, but there is increasing awareness of the values of such an arrangement to forestall sudden gaps in the ranks of high-salaried executives, many of whom are shouldering heavy responsibilities in this boom.

Reo Plant To Assemble Kaisers

Assembly of ten Kaiser automobiles per 8-hour shift will be under way by August in the Reo Motors Inc., Canadian plant at Leaside, suburb of Toronto, under supervision of Kaiser-Frazer of Canada Ltd. Tooling costs will be underwritten by K-F.

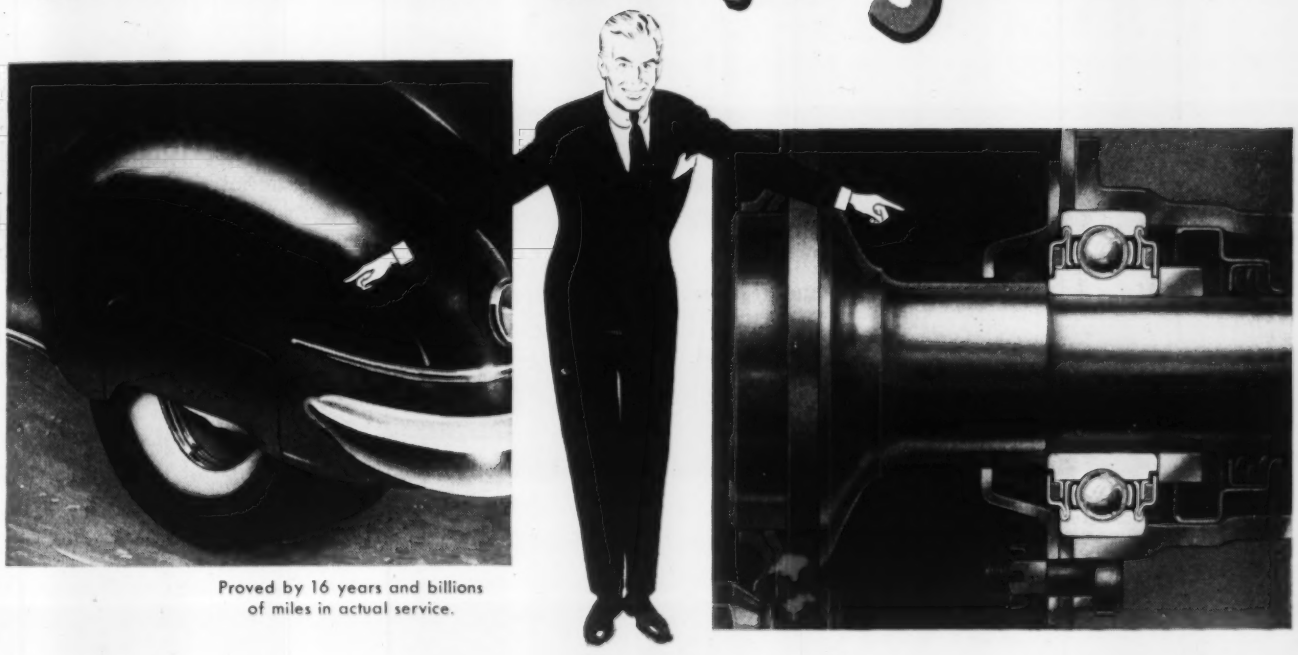
RAMBLE TO THE STATION: Latest edition of the small-size Nash Rambler is this station wagon body, mounted on the same chassis as the previously issued convertible. Carrying full custom equipment at no extra cost, the job is priced at $1808, factory. Seat upholstery can be quickly unsnapped for dry cleaning if desired. Engine is 82 hp, 6-cylinder, L-head. Inset shows closeup of the rear tailgate upper hinge support bracket, of the friction type which will hold the gate in several positions

New Departure Sealed-for-life
Rear Wheel Ball Bearings

unsurpassed

for dependability and freedom from service

Built to be forgotten!



Proved by 16 years and billions of miles in actual service.

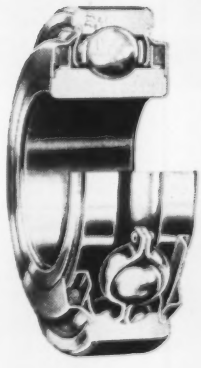
A New Departure creation—working unseen yet faithfully for driving pleasure.

Proof against neglect or wrong lubrication. No dirt can get in, no grease escape to cause slipping brakes. No bearing adjustment needed—ever! It is lubricated-for-life!

New Departure has produced over 159 million self-sealed ball bearings of various types.

This year millions of cars will roll easier—smoother—on New Departure sealed-for-life rear wheel ball bearings. Will yours?

A booklet of interest to automotive designers and owners alike will be sent on request.



Also makers of the famous New Departure coaster brake.

Nothing Rolls Like a Ball . . .

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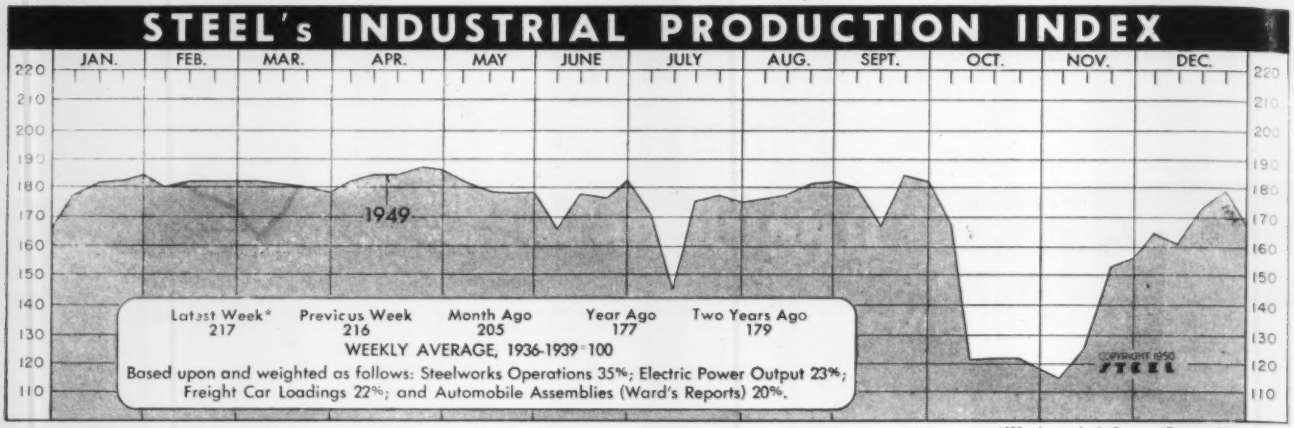
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

103


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
220 210 200 190 180 170 160 150 140 130 120 110
1949
Latest Week* 217
Previous Week 216
Month Ago 205
Year Ago 177
Two Years Ago 179
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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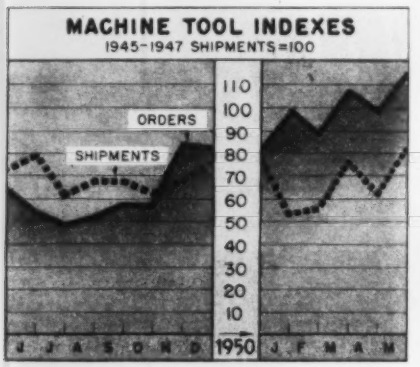
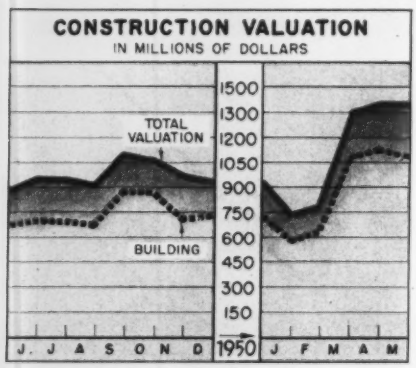
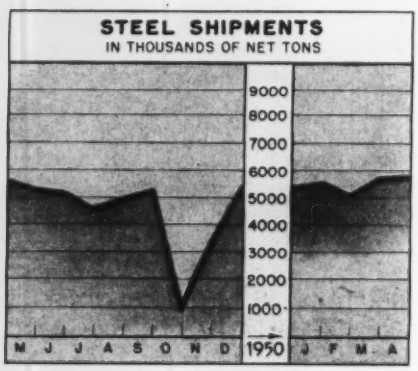
*Week ended June 17 (preliminary)




CONSTRUCTION VALUATION
IN MILLIONS OF DOLLARS
TOTAL VALUATION
BUILDING
1500 1300 1200 1050 900 750 600 450 300 150
J. J A S O N D 1950 J F M A M



Charts—Copyright 1950, STEEL

Machine Tool Indexes

	New Orders 1950	New Orders 1949	Shipments 1950	Shipments 1949
Jan.	99.7	87.0	52.4	68.8
Feb.	89.2	80.9	56.1	70.3
Mar.	107.4	93.5	75.3	75.8
Apr.	98.9	70.1	61.6	74.7
May	115.7	63.7	82.4	72.8
June	...	53.6	...	79.0
July	...	48.0	...	60.7
Aug.	...	51.5	...	67.3
Sept.	...	57.7	...	67.6
Oct.	...	56.8	...	62.3
Nov.	...	84.3	...	67.6
Dec.	...	82.5	...	75.7

National Machine Tool Builders' Assoc.

Construction Valuation

(37 States)—In Millions of Dollars

	Total 1950	Total 1949	Building 1950	Building 1949
Jan.	730.9	483.0	578.8	381.0
Feb.	779.5	568.5	627.0	415.0
Mar.	1,300.2	747.6	1,075.3	579.2
Apr.	1,350.5	842.6	1,123.5	620.2
May	1,347.6	880.3	1,083.0	666.9
June	....	945.7	....	706.7
July	....	943.6	....	690.9
Aug.	....	905.7	....	671.5
Sept.	....	1,093.7	....	870.6
Oct.	....	1,061.8	....	857.8
Nov.	....	957.8	....	701.3
Dec.	....	929.0	....	722.2
Total	....	10,359.3	....	7,883.3

F. W. Dodge Corp.

Steel Shipments

Net Tons

	1950	1949	1948
Jan.	5,482,691	5,788,632	5,410,438
Feb.	5,134,780	5,519,938	5,046,115
Mar.	5,723,340	6,305,681	5,978,551
Apr.	5,780,453	5,596,786	5,096,161
May	.....	5,234,862	5,321,375
June	.....	5,177,259	5,476,774
July	.....	4,534,855	5,229,880
Aug.	.....	4,918,314	5,329,060
Sept.	.....	5,236,196	5,511,474
Oct.	.....	935,037	5,952,008
Nov.	.....	3,296,809	5,732,256
Dec.	.....	5,410,902	6,0.6,282

American Iron & Steel Institute

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Durable Goods June5	Gear Sales June5	Ranges, Gas May29
Employ., Steel June19	Gray Iron June5	Steel Cast. May29
Employ. Metalwkg. June19	Indus. Prod. June5	Steel Forgings June5
Fab. Struc. Steel...June12	Ironers June19	Trucks, Elec. Ind...Jan.2
Foundry Equip. June19	Price Indexes May1	Vacuum Cleaners ..June5
Freight Cars June19	Pump Orders June12	Wages, Metalwkg...June19
Furnaces, Indus. ..June12	Purchasing Power..June12	Washer Sales June12
Furnaces, W. Air...May8	Radio, TV June12	Water Heaters May29

Tool Orders Zoom in May

Machine tool new orders were higher in May than in any month since April, 1946. May's buying spurt pushed the National Machine Tool Builders' Association new orders index to 115.7 from 98.9 in April. It was the second time this year that the index exceeded 100, the first time being in March. Most of the gain was in domestic orders as the foreign orders index advanced less than 1 point to 18.3 from 17.4 a month earlier. Shipments were at a 17-month high in May, reaching 82.4.

Association indexes are based on average monthly shipments in 1945-1947 equaling 100. Average annual shipments in the base period were $355 million.

No Letup in Construction's Pace

Construction contract awards in the 37 states east of the Rockies declined slightly in May from the all-time high set in April. May awards totaled $1,347,603,000 down less than 1 per cent from the preceding month. The latest figure was 53 per cent ahead of May, 1949, and called for floor area of 125.6 million square feet of building space or 72 per cent more than in the like month a year ago.

Residential awards were $674.6 million and were only $232,000 below the April figure. They topped the May, 1949, awards by 95 per cent and carried the aggregate for the first five months to an amazing 110 per cent above 1949's corresponding total.

Nonresidential awards dipped 9 per cent from the April total to $408.5 million in May but topped May, 1949 figures by 27 per cent. Public works and utilities contracts strengthened May's performance by gaining 16 per cent over April to total $264.5 million, up 24 per cent above May, 1949, awards. Total awards for the first five months aggregate $5509 million.

UNIVERSITY OF MICHIGAN LIBRARIES

The Business Trend

Note of caution is being injected into the business picture by experts who warn that the boom is at its crest and a readjustment is coming

MIDST booming output, high employment and much unsatisfied demand there is a rising note of caution. Businessmen, and financial experts are joining nonadministration economists in predicting that the boom is at its crest and the only way the economy can go is down.

There is no disposition to predict a collapse but there is a growing belief that record production and upward price pressures will soon take some of the steam out of the boom. It could be, too, that some of these experts feel that a good thing can't last forever and just want to be able to say "You heard it here first."

Almost everyone agrees that construction and automobile output are the prime factors in maintaining industrial activity at current levels. Not many people agree on how far we have to go before demand eases in these two fields. Surveys conducted recently show that many people still intend to buy one or both of these items. The jackpot question is: How many plans will be changed if prices rise or at best fail to decline?

In the matter of credit, there are already those who say we are near the limit. Should there be any tightening in credit terms, it would have an adverse effect on sales and result in production cutbacks in all metalworking fields.

Production . . .

There is nothing wrong with the present production rate. A new high is being set almost every week. In the week ended June 17 STEEL's industrial production index reached a preliminary 217 per cent of the 1936—1939 average, 1 point above the week-old former alltime high. Steelmaking, auto output and electric energy distributed were at or near alltime highs.

Automobiles . . .

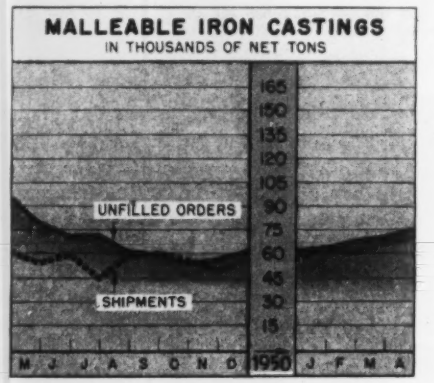
Automobile and truck producers are not worrying about where their production is going even though they are headed for another record month. U. S. plants alone will have an outturn of nearly 700,000 passenger cars this month. July will yield a smaller total because there will be less workdays but August is scheduled to exceed even this month's total. September and beyond will see a tapering in assembly schedules as changeovers for new models begin and overtime is pared. Even with the third quarter easing, U. S. passenger car production is expected to reach an unprecedented 6.6 million units. This total is far above the 5,126,060 passenger cars built in 1949 and which many said would not be approached again.

Steelmaking . . .

Last week steelmaking furnaces again operated above rated capacity. It was the tenth consecutive week in which the operating rate was 100 per cent or higher. Despite this performance demand exceeds supply and there is no indication of any easing in the scramble for steel. Faced with this condition several steel companies in recent weeks announced large expansion programs involving sizable

BAROMETERS of BUSINESS

	LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
Steel Ingot Output (per cent of capacity)†	101.5	101.5	101.0	86.5
Electric Power Distributed (million kilowatt hours)	6,012	5,921	5,845	5,373
Bituminous Coal Production (daily av.—1000 tons)	1,800	1,548	1,662	2,173
Petroleum Production (daily av.—1000 bbl)	5,347	5,305	5,118	4,922
Construction Volume (ENR—Unit $1,000,000)	$277.4	$226.7	$206.0	$150.3
Automobile and Truck Output (Ward's—number units)	203,689	200,515	175,314	146,056
*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.				
Freight Car Loadings (unit—1000 cars)	785†	796	743	649
Business Failures (Dun & Bradstreet, number)	178	164	199	196
Money in Circulation (in millions of dollars)‡	$26,993	$27,079	$26,980	$27,391
Department Store Sales (changes from like wk. a yr. ago)‡	+5%	+1%	+8%	−5%
†Preliminary. ‡Federal Reserve Board.				
Bank Clearings (Dun & Bradstreet—millions)	$13,356	$14,360	$13,818	$12,242
Federal Gross Debt (billions)	$256.3	$256.2	$255.6	$251.7
Bond Volume, NYSE (millions)	$23.7	$27.1	$19.4	$15.5
Stocks Sales, NYSE (thousands of shares)	7,929	9,542	11,433	4,634
Loans and Investments (billions)†	$67.0	$67.1	$66.7	$61.9
United States Gov't Obligations Held (millions)†	$36,183	$36,456	$36,177	$34,347
†Member banks, Federal Reserve System.				
STEEL's Weighted Finished Steel Price Index††	156.58	156.25	156.13	152.90
STEEL's Nonferrous Price Index‡	185.5	184.1	172.7	166.0
All Commodities†	156.7	157.4	155.9	154.9
Metals and Metal Products†	173.2	172.9	170.3	167.6
†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

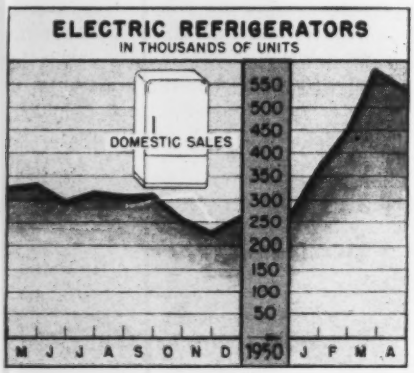


Malleable Iron Castings

Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1950	1949	1950	1949
Jan.	62.9	71.9	62	126
Feb.	60.4	66.7	67	118
Mar.	66.3	72.1	70	102
Apr.	69.8	61.3	76	95
May	...	54.6	..	79
June	...	59.6	..	70
July	...	44.4	..	71
Aug.	...	58.1	..	61
Sept.	...	60.5	..	58
Oct.	...	57.2	..	54
Nov.	...	49.4	..	56
Dec.	...	57.4	..	61
Total	...	713.1		

* For sale. Bureau of the Census

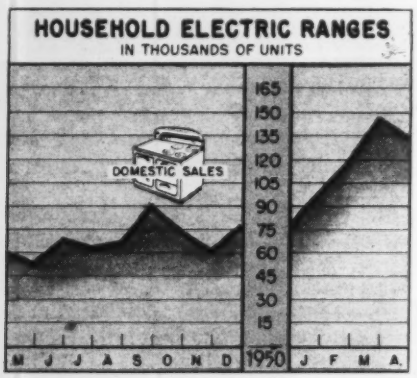


Electric Refrigerators

Domestic Sales—Units

	1950	1949	1948
Jan.	364,002	380,853	272,121
Feb.	450,751	337,424	281,580
Mar.	572,691	369,216	338,109
Apr.	531,498	324,370	330,720
May	.....	330,753	317,763
June	.....	296,199	373,115
July	.....	315,444	351,094
Aug.	.....	307,622	281,345
Sept.	.....	309,429	344,260
Oct.	.....	252,580	380,854
Nov.	.....	221,221	374,470
Dec.	.....	259,158	330,660

National Electrical Mfrs. Assoc.



Household Electric Ranges

Domestic Sales—Units

	1950	1949	1948
Jan.	97,925	106,473	103,585
Feb.	118,989	87,370	103,506
Mar.	145,417	87,543	127,461
Apr.	132,859	59,894	104,677
May	.....	52,286	98,983
June	.....	68,107	123,300
July	.....	62,402	83,485
Aug.	.....	66,222	116,107
Sept.	.....	91,073	128,829
Oct.	.....	72,672	122,516
Nov.	.....	60,523	123,661
Dec.	.....	77,011	105,387
Total	.....	903,806	1,341,497

National Electrical Mfrs. Assoc.

Charts—Copyright, 1950, STEEL

cash outlays which in turn will help sustain business at high levels.

Engineering . . .

Engineering construction contracts totaled $277.4 million in the week ended June 15 and brought the aggregate for the first 24 weeks this year to $5122 million, 45 per cent higher than a year ago. Private construction accounts for $2915.5 million and is 70 per cent over a year ago. Public construction is up 70 per cent over a year ago and totals $2206.5 million.

Prices . . .

Bureau of Labor Statistics wholesale price index declined fractionally in the week ended June 13 after advancing for nine consecutive weeks. The latest index is 156.7 per cent of the 1926 average, 0.5 per cent above four weeks earlier and 1.2 per cent above the comparable week in 1949. STEEL's scrap composite dropped $1.50 in the week ended June 15, checking a rise that started at the end of February. The nonferrous index for the same week edged up to 185.5 per cent of the 1936-1939 average. The rise in copper prices caused Westinghouse Electric Corp. to raise distribution transformer prices about 10 per cent, nullifying a cut made last March. Wheeling Steel Corp. increased prices on its galvanized ware by 7.5 per cent as the result of the rise in zinc prices. SKF Industries Inc. "reluctantly" put into effect a 5 per cent advance on its spherical roller bearings, spherical roller thrust bearings and spherical roller bearing pillow blocks.

Durables Buyers Abound

Purchase plans still numerous but there is more doubt about how long prosperity will last

DURABLE goods purchase plans still have a high priority with consumers but there is growing doubt as to how long heavy buying will keep up. The Federal Reserve Board's fifth annual survey of consumer spending plans conducted by the University of Michigan brings the foregoing facts to light.

Strong demand for houses, automobiles and appliances is one big cause of the current prosperity, economists say. More than a million consumers plan to buy new houses this year, the survey shows. This total is "somewhat larger" than a year ago. An additional number in excess of a million think they will be buying new houses in 1951.

Intentions to buy new cars showed up at least as frequently in this year's survey as last year. In addition a "substantial increase" is reported in plans to buy used cars.

Customers Galore—Plans to buy other types of hard goods are as numerous as in 1949. Intentions to purchase television sets are twice as numerous as a year ago. Furniture, washing machines and refrigerators occupy the same position on buying lists as they did last year.

More than half the persons interviewed thought prices would drop this year but the number expecting a general price decline was lower than last year. If prices not only fail to decline but move upward, the projected buying plans that showed up in the survey may not fully materialize.

Prop for Sales—Commerce Department economists say the carryover in new car demand from the war years is the big prop under current automobile sales. They further state demand for appliances has been satisfied and "the time is approaching or has already arrived when the usual market forces will determine sales of these products."

In other areas credit men are expressing concern about "nothing down and two or more years to pay" plans. Some department stores are more cautious about extending credit on appliances but easy credit is still readily available. The FRB survey, for example, showed that slightly more than three out of ten spending units spent more than they earned last year. The increase was almost entirely in the less-than-$3000 income group. Other studies point to a need for caution in extending credit.

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May Housing Starts Set Record

All previous monthly records were broken in May when 140,000 permanent dwelling units were started. Bureau of Labor Statistics preliminary figure is 11 per cent above April and almost 50 per cent ahead of May, 1949.

During May the half-million mark for houses started was passed, two months earlier than last year. The cumulative total for the first five months this year is 538,000 units, compared with 354,000 units a year ago. The sharp gain in home construction is country-wide and is shared by cities as well as outlying areas.

Philco Goal Is 1 Million TV Sets

Television sales exceeding 1 million receivers are Philco Corp.'s goal for 1950. This means the Philadelphia company will have to sell over 600,000 units in the second half as first half sales are estimated at 400,000.

The company's sales of all products are estimated at about $145 million for the first half and the goal for the entire year is $300 million, up $85 million over last year. President William Balderston says the company is aiming at 35,000-set per week production volume for television receivers this fall.

A big step toward this year's goal was made at a distributors convention held by the company when more than $100 million in appliance orders were booked, reports James H. Carmine, executive vice president. Philco's new radio and television lines took a large slice of the total. TV orders alone call for more than 340,000 sets to be shipped between now and Sept 30.

TV Sales Drop from Peak

Industry-wide television receiver sales at the retail level are off as much as 35 per cent from the peaks of eight weeks ago, says Ross D. Siragusa, president, Admiral Corp., Chicago. In Admiral's case he anticipates dealer requirements will take up production for several months.

The company's new line of TV receivers which includes 20 models was introduced with price tags ranging from $80 to $200 lower than former similar models. Mr. Siragusa believes present prices will hold for the rest of this year.

Potential Market Large

A backlog amounting to about six to eight weeks production is being built by Arrow-Hart & Hegeman Electric Co., Hartford, Conn. Inventory reductions last year which were the chief reason for the reduced earnings in the period now are paying off in a satisfactory inventory situation.

The company sees a great potential market for industrial electric controls in various types of machinery. This condition is foreseen despite an expected price increase of as much as 10 per cent before yearend.

Since 1948 exports from Arrow-Hart's U. S. operations have dropped 60 per cent because of dollar shortages. Formerly the company used to ship to South America, the Netherlands, Egypt and the Scandinavian countries. Much of the lost export volume is going to the company's British subsidiary.

Steep Rock Sells 1950 Output

Steep Rock Iron Mines Ltd., Steep Rock Lake, Ont., has sold its entire 1950 ore output in advance at an increase of 55 cents per ton over prices received last year.

Shipments in 1950 are expected to equal or exceeed the 1,134,261 tons shipped last year. Steep Rock has an expansion program in progress to increase its production to nearly 3 million tons annually.

Foreign Markets Weaken

Metalworking's exports show effects of dollar shortages, rebuilt industries and tariff walls

FOREIGN markets for products of the American metalworking industry are shrinking and won't take up the slack if domestic demand should decline.

The dollar shortage, rebuilt and expanded European industries and tariff barriers are combining to reduce overseas shipments of metal products and equipment. Although the decline is evident in all finished manufactures, it is particularly severe in several metalworking lines.

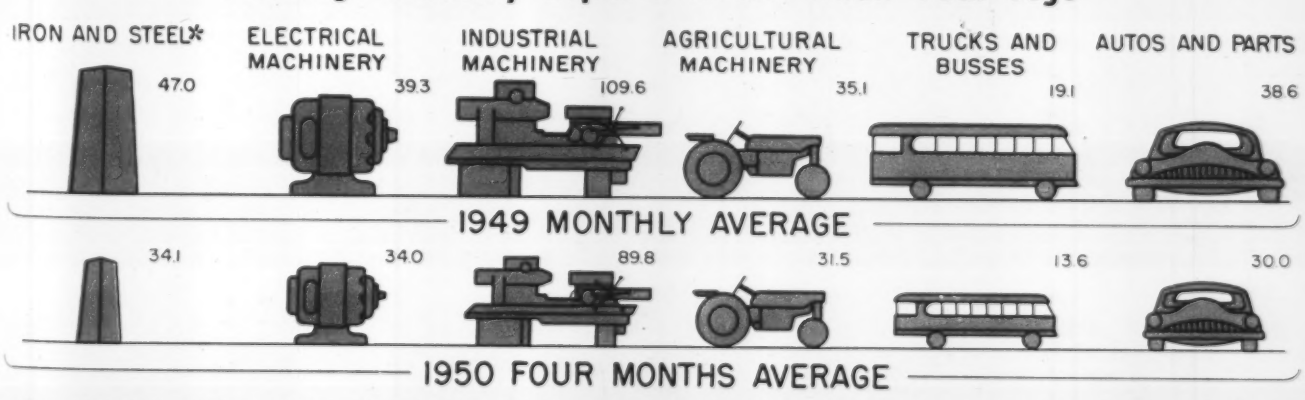
Average monthly exports for the first four months this year are below the 1949 monthly average in all six metalworking lines shown on the accompanying chart. The largest dollar decline is in industrial machinery where the monthly average this year is almost $20 million below the monthly average for all 1949. Motor trucks and busses suffered the greatest percentage decline, being down 28.8 per cent below the 1949 monthly average.

Steel mill manufacturers in combination with iron and steel advanced manufactures were down 27.4 per cent below last year's monthly average.

U. S. exports of finished merchandise fell to $445.6 million in April from $488.9 million a month earlier. Most of the April decline was due to a drop in industrial machinery exports to $91.1 million from $101.6 million in March, merchant vessels to $12.9 million from $21.1 million and electrical machinery and apparatus to $33.1 million from $40.1 million.

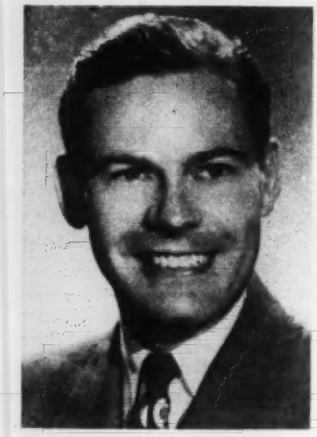
Not only are sales to dollar-short countries difficult but competition from European nations is cutting into many overseas markets and edging into the domestic picture.

Average Monthly Exports Lower Than Year Ago



Figures in millions of dollars. * Includes iron and steel advanced manufacturers

Men of Industry



JOHN R. MORRILL
. . . Baker-Raulang V. P. sales

John R. Morrill was elected vice president in charge of sales, **Baker-Raulang Co.,** Cleveland, effective July 1. **H. Dudley Swim** was elected chairman of the board and **Clarence M. Taylor,** chairman of the executive committee. Mr. Morrill has been with Lincoln Electric Co. where he was engaged in engineering, sales and promotional work, and was assistant to the vice president in charge of public relations, sales promotion, dealer relations and advertising.

James E. Jones succeeds **Basil M. Graham** as president, **Central Iron & Steel Co.,** Harrisburg, Pa., subsidiary, Barium Steel Corp. Mr. Jones is also treasurer of the company. **Irving M. Smith,** formerly manager of sales, was elected assistant secretary and treasurer, and **Fred L. Steuber** becomes general manager of sales. Mr. Graham also resigns as president, Phoenix Iron & Steel Co. and Phoenix Bridge Co., Phoenixville, Pa., also Barium subsidiaries.

J. M. Gillard was appointed manager, wire and wire products sales, **Detroit Steel Corp.,** Detroit. He was sales manager, Detroit district office, a post now held by **T. R. Adams,** formerly Toledo, O., district manager.

E. B. Whittemore was appointed manager, specialty spring steel department, **Cold Metal Products Co.,** Youngstown.

Walter T. Moreland was appointed general sales manager, **Lone Star Steel Co.,** Dallas. **J. M. Hollingsworth** was appointed assistant sales manager, and **John M. Morris,** sales engineer.

HUGH M. NAZOR
. . . Smith Iron, division vice president

Hugh M. Nazor was elected vice president in charge of sales, Smithcraft Lighting Division, **A. L. Smith Iron Co.,** Chelsea, Mass., effective July 1. He has been with Graybar Electric Co. for the last 14 years.

New Departure Division, Bristol, Conn., General Motors Corp., announces that on July 1 the following men will retire under terms of General Motors' retirement plan. They are: **Newton D. Howell,** who has been ball bearing sales engineer at the Detroit zone office: **Alwin A. Gloetzner,** manager, southeastern zone at Washington; and **George A. Ellis,** sales representative for New Departure bicycle coaster brakes in the southeastern states.

Raymond H. Cramer succeeds the late **H. O. K. Meister** as general manager, **Hyatt Bearings Division,** Harrison, N. J., General Motors Corp. He has been works manager of the division.

W. B. Klee has resigned as assistant secretary and assistant to the executive vice president of **Copperweld Steel Co.,** Warren, O. He has established offices in Warren and expects to enter business there.

Donald Poor, advertising and sales promotion manager, Ceco Steel Products Corp., Chicago, was elected president of the **Chicago Industrial Advertisers Association.**

John H. Clough, board chairman, General Electric X-Ray Corp., Milwaukee, subsidiary, General Electric Co., becomes, July 1, president of **Fairchild Camera & Instrument Corp.,** New York.

NORMAN J. FROELICH
. . . asst. gen. mgr. sales, Pittsburgh Steel

Norman J. Froelich was named assistant general manager of sales, **Pittsburgh Steel Co.,** Pittsburgh. He has been manager of sales, wire and wire products, Detroit Steel Corp., and prior to that was general manager of sales, Portsmouth Steel Corp. During the war he was with the steel division, War Production Board.

Thomas M. Camerden was appointed Pittsburgh district manager of sales, **American Steel & Wire Co.,** Cleveland, subsidiary, U. S. Steel Corp. He fills a post which has been vacant since the death of **J. J. Reagan** last March. **Paul L. Lindsay** succeeds Mr. Camerden as manager, Cincinnati district sales office, and is succeeded as general staff manager of the company's sales department by **Wilmer H. Cordes.**

Thomas M. Stinson was appointed general manager, steel barrel division, **National Enameling & Stamping Co.,** Chicago. He rejoined Nesco after serving for a year as general sales manager, U. S. Steel Products Co., subsidiary, U. S. Steel Corp.

Clarence E. Muehlberg was appointed sales manager of gas products, meter and valve division, **Rockwell Mfg. Co.,** Pittsburgh.

F. L. Roewer, for the last 15 years with International Nickel Co., was named sales manager, **Abrasive Alloy Castings Co.,** Bridgeboro, N. J.

Industrial Chemicals Division, **American Cyanamid Co.,** New York, appointed **Dr. A. J. Weith Jr.** and **J. F. Allen** as technical service represent-

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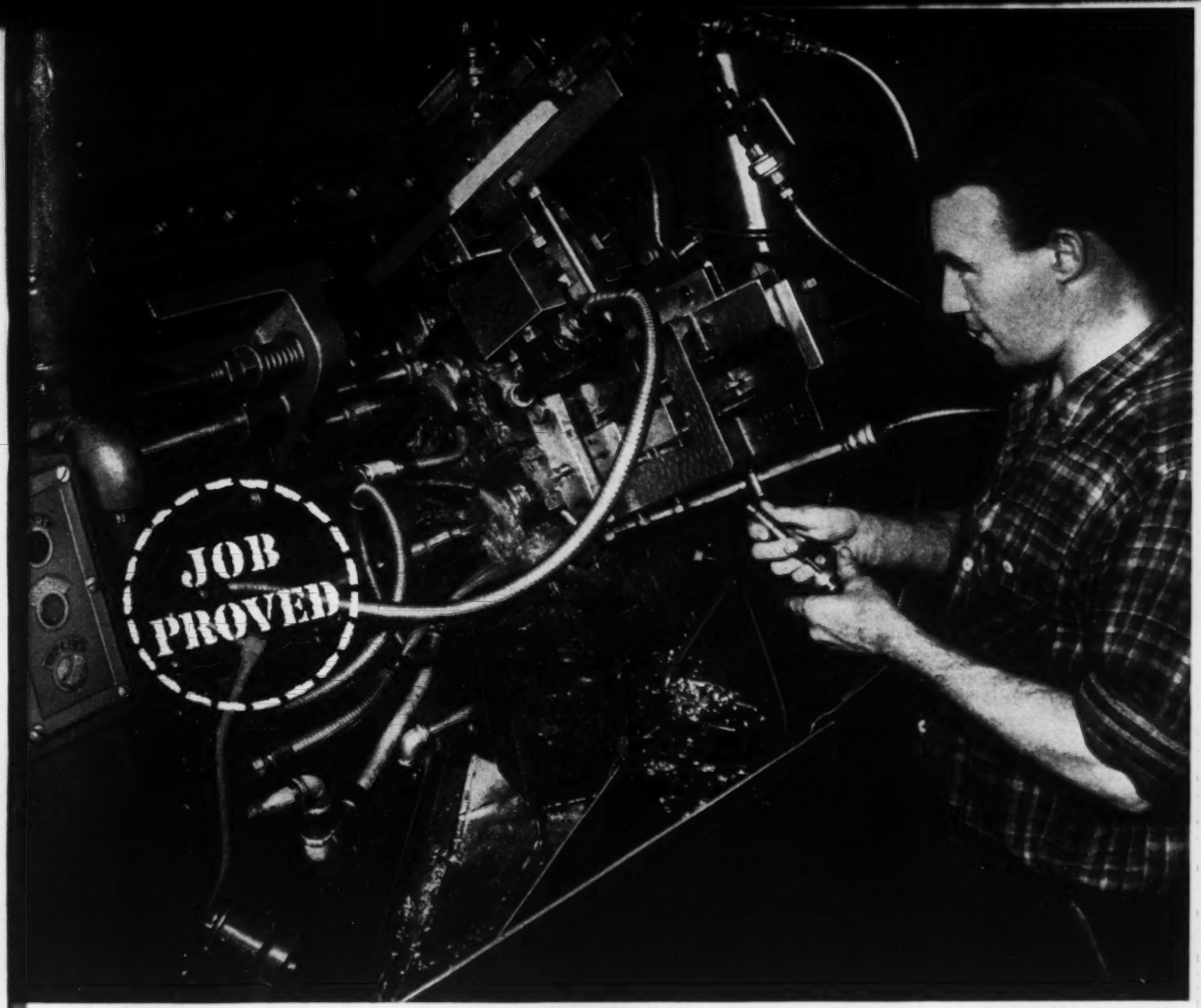

SUNICUT DELIVERS UNEXPECTED BENEFITS

Action Taken To Improve Working Conditions Results in Better Finishes, Longer Tool Life

A cutting oil that "fogs" excessively is annoying to operators. Droplets form and drip from overhead. So when this occurred three years ago in a large metalworking plant, the owner lost no time in taking action.

Accepting the advice of a Sun representative, he tried a "Job Proved" Sunicut oil. This ended the annoyance. It did far more besides. Being transparent, Sunicut made it easier for the operators to take micrometer readings on the work. It improved finishes remarkably and increased tool life 25 percent. Recently a switch was made to *new* Sunicut with Petrofac—and results have been even better.

The new Sunicut grades are giving outstanding performance throughout the metalworking industry. They are transparent, nonemulsifying oils with superior metalwetting, antiweld and extreme pressure qualities. For more information write for folder S-6.

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"JOB PROVED" IN EVERY INDUSTRY

SUNOCO®

atives of its synthetic organic chemicals department.

Charles F. Stein has joined **Doehler-Jarvis Corp.,** New York, as general

CHARLES F. STEIN
. . . purchasing, Doehler-Jarvis

purchasing agent. For the last four years he has been senior buyer of Kaiser-Frazer Corp., Willow Run, Mich.

Thomas A. Farrell, vice president and a director, **Dearborn Motors Corp.,** Detroit, since its organization in 1946, was named president succeeding **Frank R. Pierce,** killed in a plane crash May 25. Before joining Dearborn Motors Mr. Farrell spent 21 years with the Hyatt Bearings and Frigidaire Divisions of General Motors Corp. Other appointments include: **Merritt D. Hill,** promoted from general sales manager to vice president and director; **G. D. Andrews,** from assistant general sales manager to vice president of sales; **Ralph E. Hunt,** from engineering and manufacturing manager to vice president of engineering and manufacturing; **I. R. Kappler,** from manager of purchasing to vice president of purchasing; and **James F. Pedder,** from advertising and sales promotion manager to vice president of advertising.

Joseph van Ackeren, vice president and assistant general manager, engineering and construction division, **Koppers Co. Inc.,** Pittsburgh, has retired from active management with the company, but is retained as a consultant. He is succeeded as assistant general manager by **George M. Carvlin,** vice president of the division.

C. L. Warner, Haller Oven Co., Pittsburgh, was appointed sales representative for **Ferro Enamel Corp.,** Cleveland, in the eastern Pennsylvania territory. He will represent the company in the sale of industrial ovens, dryers, metal cleaning equipment and complete synthetic finishing departments.

Robert W. Maney was appointed manager, Los Angeles plant, **Goodyear Tire & Rubber Co.** He succeeds **Frank A. Steele,** who is retiring Sept. 1 after 40 years of continuous service in the production division.

R. L. Peaslee has joined **Wall Colmonoy Corp.,** Detroit, as development engineer. For the last nine years he has been with Wright Aeronautical Corp. as metallurgist. Mr. Peaslee will be in charge of the development of Colmonoy brazing alloy as a stainless and alloy steel brazing material.

R. W. Johnson was appointed director of sales, industrial gear division, **Foote Bros. Gear & Machine Corp.,** Chicago. He joins Foote Bros. after

R. W. JOHNSON
. . . dir. sales, Foote Bros. industrial gear div.

17 years' experience in the power transmission field. During most of the 1940s he was with Whitney Chain & Mfg. Co., Hartford, Conn., as general sales manager, and for the last year was with Bearing Engineering Co., San Francisco.

Ralph Koeneman was appointed chief engineer, passenger car engineering, Berwick, Pa., plant, **American Car & Foundry Co.**

A. J. Phelan, formerly vice president and chief engineer, **Turbodyne Corp.,** subsidiary, Northrop Aircraft Inc., Hawthorne, Calif., was elected president, general manager and chief engineer. He succeeds **Thomas H. Quayle,** formerly president and general manager, who was named director of **Associated Products,** a division of Northrop.

Charles Fuerst was appointed assistant foundry division superintendent, **Falk Corp.,** Milwaukee.

Paul E. West, formerly assistant general manager, Armstrong Furnace Co., Columbus, O., was appointed assistant to vice president of **Hudson Motor Car Co.,** Detroit.

Roy F. Johnson was appointed manager, sales and service engineering, **Pullman-Standard Car Mfg. Co.,** Chicago.

Phoenix Iron & Steel Co., Phoenixville, Pa., subsidiary, Barium Steel Corp., elected: **R. Eberstadt,** president; **R. E. Craig,** treasurer; **J. C. Banser,** secretary; **J. G. Coutant,** assistant treasurer; **C. H. West,** assistant treasurer and assistant secretary; and **W. Cook,** general sales manager. In addition, **W. F. Zerbe, J. E. Jones** and **Alexius E. Eck,** officers of Central Iron & Steel Co., another Barium subsidiary, were elected vice presidents of Phoenix.

Grant S. Wilcox, assistant factory manager, Plymouth Division, Chrysler Corp., was elected president, **Engineering Society of Detroit.** He formerly was chairman, Detroit Chapter, American Society of Tool Engineers.

James G. Willis was appointed Pacific district manager of **Harris-Seybold Co.,** Cleveland, manufacturer of color printing presses and paper cutting machinery.

John F. Miller was elected vice president, **Illinois Tool Works,** Chicago. He joined the firm last September as manager of its tool division. He has

JOHN F. MILLER
. . . Illinois Tool Works vice president

been active in the machine and cutting tool industry for 20 years. In his new position Mr. Miller continues to manage engineering, manufacture and sale of standard and special

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JAMES G. RAYBURN
. . . dir. merchandising, Lamson & Sessions

WILLIAM E. CUSTAR
. . . asst. sales manager, Lamson & Sessions

JAMES J. MALONE
. . . V. P., United Platers Inc.

metal cutting tools produced by the company.

Lamson & Sessions Co., Cleveland, appointed **James G. Rayburn** merchandising director, and **William E. Custar,** assistant sales manager. Mr. Rayburn joined the company in 1945 in a sales capacity, and has since served as assistant to the railroad sales manager, and later sales assistant in the general offices. In addition to merchandising activities he retains control of a number of diversified sales functions. Mr. Custar has been with Lamson & Sessions 15 years. He served as assistant manager, aircraft division, and later as manager, machine screw sales. His sales activities are now broadened to include the general product line.

William E. Lynch Jr. was appointed assistant superintendent of rolling mills, Midland Works, **Crucible Steel Co. of America,** Pittsburgh.

Gilbert V. Blanquart was appointed supervisor, salary administration division, **United States Steel Corp. of Delaware.** He succeeds **A. R. Mathieson.**

R. Park Lamborn, general purchasing agent, Kennecott Copper Corp., was elected president, **Purchasing Agents Association of New York,** New York. Other officers elected are: **Edward A. Bantel** and **John F. Snedeker,** vice presidents; **Edward B. Fielis,** treasurer.

Melvin C. Harris, until recently manager of the Cleveland plant of Chase Brass & Copper Co. Inc., subsidiary, Kennecott Copper Corp., will become associated with **Eastern Stainless Steel Corp.,** Baltimore, on July 1 as general manager, and will be elected a vice president at an early meeting of the board of directors. Before joining Chase Brass in 1949, Mr. Harris had devoted his entire business career to the stainless and alloy steel industry, having been employed, from 1915 to early in 1949, by Allegheny Ludlum Steel Corp.

Non-Ferrous Permanent-Mold Inc., Mansfield, O., named **T. S. Roderick** general manager of the corporation.

James J. Malone was appointed vice president, **United Platers Inc.,** Detroit. Formerly assistant general manager, he has been associated with the company for 15 years.

National Lead Co., New York, appointed **Reginald Rowand** manager, production department, Baroid Sales Division, and **Earl H. Murchison** to succeed Mr. Rowand as superintendent, Magnet Cove, Ark., barytes operation. **Robert B. Spitzer,** general superintendent, Rossi-Merced mines and plant, takes on additional duties of superintendent, El Portal mines and plant. **Dr. F. J. Williams** will direct research activities at Houston for Baroid and is succeeded as technical director, Brooklyn laboratories, by **Dr. J. A. Orsino.**

Robert G. MacDonald will join **Heil Co.,** Milwaukee, July 1 as director of industrial relations. He has been industrial relations director for Geuder, Paschke & Frey Co.

Daniel F. McGlinchey was elected vice president, **Phelps Dodge Copper Products Corp.,** New York.

OBITUARIES . . .

Gen. Thomas S. Hammond, for the last several years chairman of the board, **Whiting Corp.,** Harvey, Ill., and formerly president and general manager, died June 15 in Chicago.

Adolph Hreck, 47, president, **Master Diamond Tool Co.,** Niagara Falls, Ont., Canada, died June 10.

John R. Pitman, 80, a founder and director of **Duriron Co. Inc.,** Dayton, O., died at his home in Orange, N. J., June 17.

James A. Phillips Jr., 49, who established the aircraft parts manufacturing firm, **Phillips Aviation Co.,** Burbank, Calif., died June 7.

George W. Pressell, 62, vice president, **E. F. Houghton & Co.,** Philadelphia, died June 5 at his summer home in Ocean City, N. J.

William C. Duwe, 62, vice president and one of the founders of **Ajax Sheet Metal & Iron Works,** Milwaukee, died June 4.

Fred C. Augustine, 57, former assistant production manager, **A. O. Smith Corp.,** Milwaukee, died June 6.

Granville Brooks, 49, Los Angeles district manager, **Kaiser-Frazer Corp.,** died of a heart attack June 8.

Ralph B. Butterfield, an office manager of **Brace-Mueller-Huntley Co.,** steel warehouse firm, Syracuse, N. Y., died June 12.

John G. Henderson, 69, retired plant superintendent, **Buffalo Machinery Co. Inc.,** Buffalo, died June 12.

Joseph A. Klein Jr., 55, president, **Mathias Klein & Sons,** Chicago, died June 14.

Edwin A. Bender, 52, purchasing agent, **Cleveland Tractor Co.** and its successor, **Oliver Corp.,** Cleveland, died June 18.

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Fluid-Film is a non-pigmented semi-plastic emulsion that dilutes with water or oil up to two parts of diluent to one of compound . . . Produces a coating very adherent to metal with a film strength of higher resistance to pressure than most pigmented products.

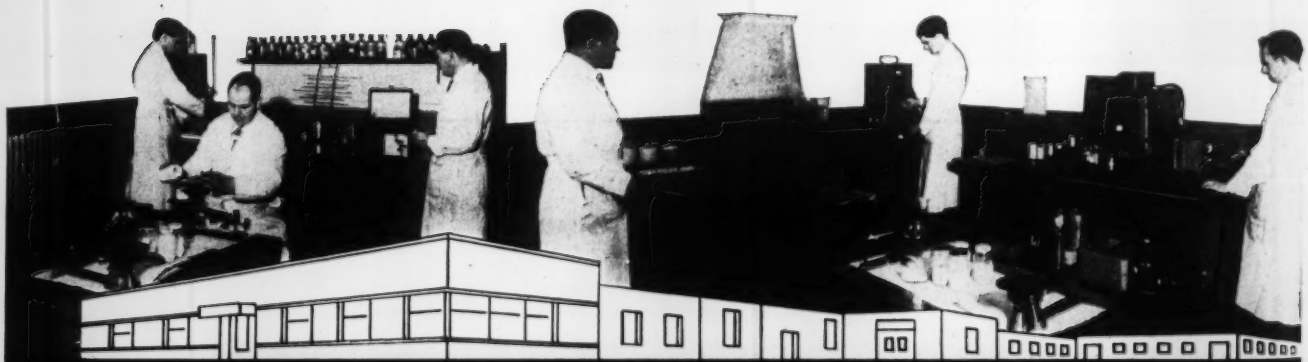
Fluid-Film brushes as easily as a good paint over mill oil surfaces or it may be rolled, dipped or sprayed. After coating, blanks may be put in the press in the wet form or may be air or force dried.

Fluid-Film is adaptable to stampings of ferrous and non-ferrous metal; for tube drawing of brass, copper and steel; for drawing of copper and steel wire . . . Weld through it; anneal it—obtain a perfect job without precleaning, with practically no residue.

Fluid-Film presents no cleaning problem . . . It is readily removable in any of our standard alkaline soaks and sprays.

Fluid-Film is economical—both in price per pound and in use . . . A little goes a long way.

Fluid-Film is made by the manufacturer of nationally used specialized cleaning products and SUPER-DRAW drawing compounds . . .



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Production AND Engineering NEWS AT A GLANCE

NO HOT "FINGERS"— Performing tasks in radio-active areas unsafe for human beings is an every day job for a 5-ton, one-armed robot on wheels which does any work expected of the human hand in the Atomic Energy Commission's production of plutonium at the Hanford Works near Richland, Wash. Developed by General Electric Co., Schenectady, N. Y., the robot, called the "tool dolly" resembles a railroad handcar with a small-calibre deck gun mounted on it. Gun-like portion is a telescoping arm with double clamps at the end. It can be shortened, raised or lowered by remote control—the "hand" being capable of a wrist-bending motion, rotation and gripping. Such operations as taking apart and reassembling machinery, opening and closing doors or picking up objects as small as dimes are all in a day's work for the dolly.

PUTS ON THE HEAT FAST— A 1-inch length of steel rod can be heated to 1500° F in about three seconds by a new low-cost portable high frequency induction heating unit developed by Lepel High Frequency Laboratories Inc., New York. The unit, which is reported ideal for hardening, annealing, normalizing and soldering ferrous and nonferrous metals, will braze carbide tips to cutting tools up to 1½-inch square; it can melt 4 ounces of steel or brass in four minutes. Designed to operate continuously, it fits in well with requirements of machine shops or research labs.

SAVES MORE THAN CUTTING TOOLS— A 19-foot tapered wing spar cap for a fighter plane when produced by conventional machining methods requires 207 pounds of material, of which 145 pounds must be removed in 85 man-hours of machine work. According to the Army Air Force, only 64 pounds of material are necessary when using a heavy forging press. As only 2 pounds of the material has to be removed, machining time is reduced to five man-hours.

COOLS LARGE MOTORS— Finned tube air-to-air heat exchanger developed by Elliott Co., Jeannette, Pa., presents a totally new idea for cooling large enclosed motors. Comprising a single rectangular unit, the exchanger is located at the top of the welded steel motor frame. A fan is employed to draw cooling air from outside the motor, through the tubes and out the front of the motor enclosure. Air within the motor is passed over the finned tubes, cooled and recirculated. Because the entire exchanger can be drawn out from the motor enclosure, repairing or replacement is a simple matter.

OPERATION "COOKIE"— Gerity Michigan Mfg. Co., which is operating the USAF manufacturing methods pilot plant at Adrian, Mich., is fast becoming a mecca of advanced production-engineering talent in the aeronautical industry. Activities taking place here can be summed up as "operation cookie" as chief aim of all this talent is developing methods of stamping out like cookies massive sections for supersonic aircraft. Already installed in the 17-acre plant are 15 extrusion presses, ranging from 1650 to 5500 ton capacity. In process of installation are four huge hydraulic presses removed from Germany. Largest is a 15,000-ton forge press. The plant is the only manufacturing research center of its kind in the world, and will be used strictly as a "proving ground." In time of emergency it can be turned into a production unit.

"STORED ENERGY" WELDING— Studs up to ½-inch diameter can be welded to base metals of a wide variety of types and thicknesses—without use of fluxes—by a "stored energy" method, developed by Graham Mfg. Co., Detroit. Specially made studs play on important role in the success of the process which involves a gun type welder. System can be employed to weld similar or dissimilar metals in combinations. It also joins studs accurately to extremely thin base metals without marring the surface of the work. (p. 72)

TESTING BY PITCH—Highly refined version of the old practice of tapping a suspended grinding wheel with a hammer and listening to the pitch and quality of the resulting musical tone is now used to determine hardness or "grade" of abrasive products. The new sonic testing technique, developed by Carborundum Co., is a significant step in the production of standardized abrasives to keep pace with automatic grinding machines and increasing emphasis on extreme grinding accuracy. (p. 74)

HOW ROUGH IS ROUGH—What is the physical depth of a microinch of roughness? The answer to that may be supplied soon through combined efforts of General Motors and Chrysler research groups. Up to now there was no physical standard by which surface roughness could be measured with assurance that results were comparable from shop to shop. The GM-Chrysler geometric system promises to overcome many difficulties, although actual shop experience is needed before any further headway can be made. (p. 78)

POSITIVE SIGNALING—More efficient blast control is to be provided to blast furnaces by means of a new signal system developed by Carnegie engineers. It is said to make it possible for each blowing room operator to know the blowing setup at all times on each furnace. It also will provide the furnace operator with a check as to whether wind change instructions were received and executed. System includes two panels in each furnace cast house and blow room—one for lights, the other for control switches. (p. 86)

"STORED ENERGY" Welds Dissimilar Metals

Studs up to ½-inch diameter joined to base metals of wide variety of types and thicknesses. Readily adapted to mass production processes, new gun technique requires no special metal preparation or fluxes

By A. H. ALLEN
Detroit Editor, STEEL

AUTOMATIC welding of studs up to ½-inch diameter to base metals of a wide variety of types and thicknesses, with no fluxes or special preparation of the base metal, is possible by means of a recently developed "stored-energy" welder readily adapted to mass production processes.

Capable of making up to 4000 welds per hour when equipped with hopper feeds and indexing tables, the equipment welds like or dissimilar metals in combinations. It joins studs accurately to extremely thin base metals without marring the surface of the work piece with a minimum of flash or fillet.

Key to the process is a small cylindrical tip, machined or cold headed, on the joining face of the stud. The diameter and length of this tip varies with diameter of stud to be welded, and materials involved. The studs are made either as cold headed or screw machined products to meet customer specifications and requirements. They may be threaded or unthreaded, plain or of the collar or shoulder type. Considerable engineering is involved in the manufacture of the studs, both as to quality control and in the effective reduction of stud costs.

Fed to Welding Gun—The studs are fed to a welding gun which is designed with a piston and piston rod extending downward out of the gun body, with collets of varying sizes, as required, attached to the end of the gun. The gun is actuated by air pressure, the piston rod moving the stud through the collet to the workpiece, which is held firmly in place on the table of the welding machine.

Piston, rod and collet assembly is returned to the "up" position by air pressure on the rod side of the piston. This pressure is constant while the machine is in operation. Pressure for moving the stud downward is applied when welding is desired. Control of the speed at which the stud travels toward the work may be varied by changing pressure on the rod end of the piston or on the so-called "restored" air pressure.

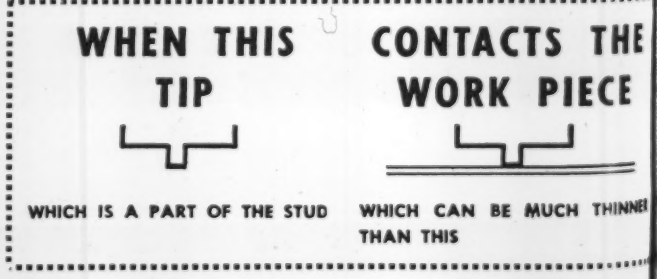
Very Short Weld Cycle—Condensers for storing the necessary electrical energy to activate the weld are mounted inside a cabinet in the base of the machine. Normally, two condensers are required per weld, and they are charged either by an electronic rectifier or a motor-generator set, also built into the machine cabinet. Two condensers are fully charged in 0.8-second, while the weld cycle requires only 0.001-second.

The method is a development of the Graham Mfg. Co., Detroit. Already many type machines using the basic principle are in operation on different types of stud welding jobs, ranging from small nameplates to large brackets and other formed pieces which must have studs for attachment.

Any low-carbon ferrous or nonferrous metals weld satisfactorily, and different combinations of the two may be used. There are a few limitations as to metal, including high sulphur or lead content, or occasionally high carbon content. Steel to steel, steel to brass, steel to stainless or plated steel, aluminum to die cast zinc, aluminum to aluminum, copper to steel, aluminum to copper, brass to die cast zinc, etc., have been welded without difficulty. Steel to aluminum is not practical because of the wide differential in heat conductivity.

Arc Provides Melting Heat—Process derives the heat required to melt surfaces to be welded by the formation of an intense arc, and is not dependent upon the resistance of the metals to electric current. This is the essential difference between the Graham method and conventional resistance welding which allows the joining of ferrous and nonferrous metals in various combinations. In view of the short time of the arc—0.001-second—studs are welded with little or no fillet, no distortion of the work and a minimum of heat.

Basic equipment includes a cabinet providing a work table for mounting and clamping the work to which studs are to be welded, and space for enclosing condensers, power supply, relays and wiring. A pneumatically operated clamp is provided for clamping work securely. Clamped to the work table is a post with an arm for supporting the welding gun or multiple guns. A variation in design involves a rotating work table, arranged to index under a gun mounted on a rear column.



Control of the electrical discharge is by means of a pneumatically operated contactor which interrupts the charging circuit and makes the welding circuit complete to the gun. The contactor is actuated by pushbuttons which are mounted on the front of the cabinet where operator can reach them conveniently. Buttons also control the air on the welding gun.

Stud Travels 30 Feet Per Second—Principle of the welding action may be explained by tracing electrons through a cycle. After charging the condensers to their capacity by taking electrons away from the positive plates and adding them to the negative plates, the charge is conducted to the welding gun, the collet and the stud which are at this time traveling toward the workpiece at a rate of about 30 feet per second.

The positive side of the condenser is connected to the work table and then through ground clamps to the workpiece. As the stud travels downward, the tip is the first to approach and contact the workpiece. The discharge thus is initially concentrated at the small tip on the stud. The high current flow and "overcrowding" of electrons at this point causes overheating and almost instantaneously the tip burns or explodes. Molecules in the air around the tip become ionized and immediately the major flow of electrons from the stud to the workpiece is effected, causing an arc from the face of the stud to the work.

Blow Joins Components—During the arcing process the face of the stud becomes molten, as well as a like area on the workpiece. Simultaneously the stud meets the work and a hammer blow from the inertia of the moving piston and collet assembly forces the two parts to be welded. This entire process, it will be recalled, takes only 0.001-second. No timing devices or auxiliary cooling means are involved.

Multiple-head units permit welding two or more studs simultaneously, in clusters with as little as 1½-inch centers. Individually fired studs can be located within ¼ to ⅜-inch of each other. Each welding unit is self-contained, requiring only standard electrical and air supply—220-440 three-phase alternating current power and 80-pound air. Operators may be seated during the welding operations, and the available bench top work area reduces material handling factors and resultant loss of time. Power supply is less than 2 kva in the largest type machines.

A further refinement is the adaptation of stud selection and feeding devices, arranged pneumatically to deliver studs one at a time, and in proper position to the welding gun.

Different sizes of spring collets, to accommodate different sizes of studs, are interchangeable between welding guns, adding to the flexibility of the equipment. It is claimed that stud locations can be maintained consistently within tolerances of 0.003-inch.

Fig. 1—"Stored energy" stud welder in operation at Ford plant attaching 5/32-inch diameter steel studs, 7/16-inch long, to steel cover plate used on instrument panels where no radio grille is required. This is a dual-gun unit with automatic feed, feeding studs from hoppers to guns

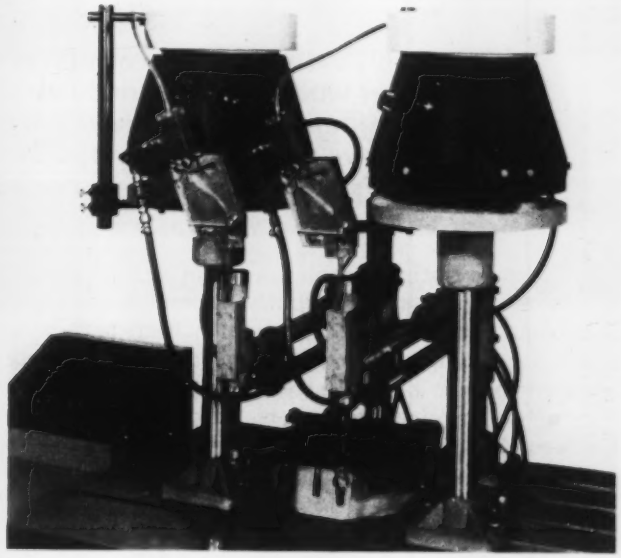


Fig. 2—Closeup of same unit shown in Fig. 1, showing arrangement of hopper feed and special chutes which automatically position studs properly before they descend to the spring collet on welding gun

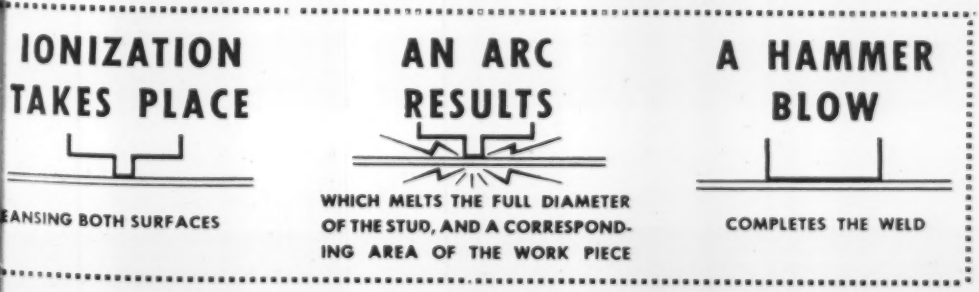

IONIZATION TAKES PLACE
CLEANSING BOTH SURFACES
AN ARC RESULTS
WHICH MELTS THE FULL DIAMETER OF THE STUD, AND A CORRESPONDING AREA OF THE WORK PIECE
A HAMMER BLOW
COMPLETES THE WELD

Fig. 3 — Diagrammatic representation of stud welding cycle which takes place in 0.001-second

Fig. 1—Work position station of sonic testing machine arranged to measure frequency vibration of disk-like bodies such as grinding wheels

Fig. 2—Wheel in testing position on the four studs being contacted by stylus of electro-mechanical transducer or vibrator shown at rear of photograph

Fig. 3 — Testing machine in plant operation for routine grading of abrasive wheels

Sonic Tests Grade Abrasive

Highly refined version of old practice of tapping suspended grinding wheel with a hammer and listening to the pitch and quality of the resulting musical tone is now used to determine hardness of "grade" of abrasive products. New application of this rapid inspection technique is significant step in production of standardized abrasives

USE of sonic testing techniques to determine "grade" of abrasive wheels is a significant step in the production of standardized abrasives to keep pace with automatic grinding machines and with the increasing emphasis on grinding to extreme accuracy. This rapid and nondestructive method is now being used by Carborundum Co. for routine product inspection.

Testing procedure and apparatus were developed in the company's laboratories through the joint efforts of research and production personnel. As the art of abrasive wheel manufacture progressed through the years, so have methods for testing the finished abrasive articles. An important characteristic is that known as "grade" or hardness, which is a measure of the tenacity with which the individual particles of abrasive are bonded together and hence of the performance of the grinding wheel.

Several Grading Methods—Here are several ways by which wheel grades can be determined. One method comprises a chisel-shaped manually applied tool pressed into the wheel by a skilled operator, the operator grading the wheel within broad limits by the "feel".

A second procedure, known as the "impact" method, involves a mechanism for repeatedly dropping a hardened tool upon the wheel surface and measuring the depth of tool penetration after a fixed number of drops. A further method consists in subjecting the body to a pointed oscillating tool forced into it by a known pressure, and measuring depth of tool penetration upon completion of a fixed number of oscillations. Still another testing device measures depth of depression in the abrasive body which is produced by a sand blast that blows a fixed amount of granular abrasive through a nozzle against the body.

New Technique Faster—Based upon the premise that two bodies identical in every respect will have identical periods of vibration, an accurate inspection technique has been developed for the rapid grading of abrasive and other products[1]. The process is such that for substantially identical equipment and labor costs approximately eight to ten times as many pieces may be tested as by earlier methods.

This technique involves rapid measurement of the frequency of resonant vibration of the grinding wheel. It is a highly refined version of the old practice of tapping a suspended grinding wheel with a hammer and listening to the pitch and quality of the resulting musical tone. Now the hammer is replaced by a tiny

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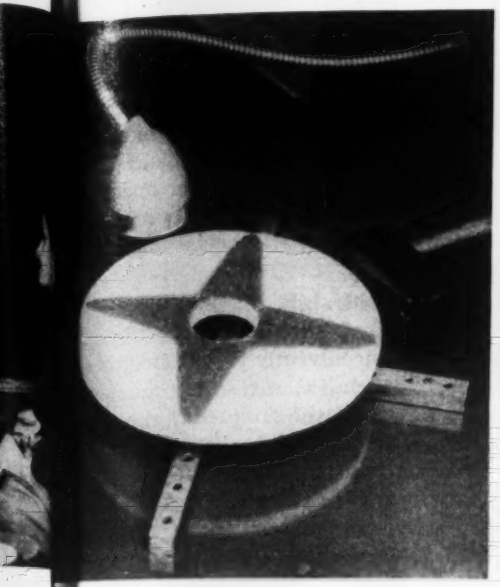

Fig. 4—Grain or "sand" pattern produced when wheel is vibrated at its lowest mode

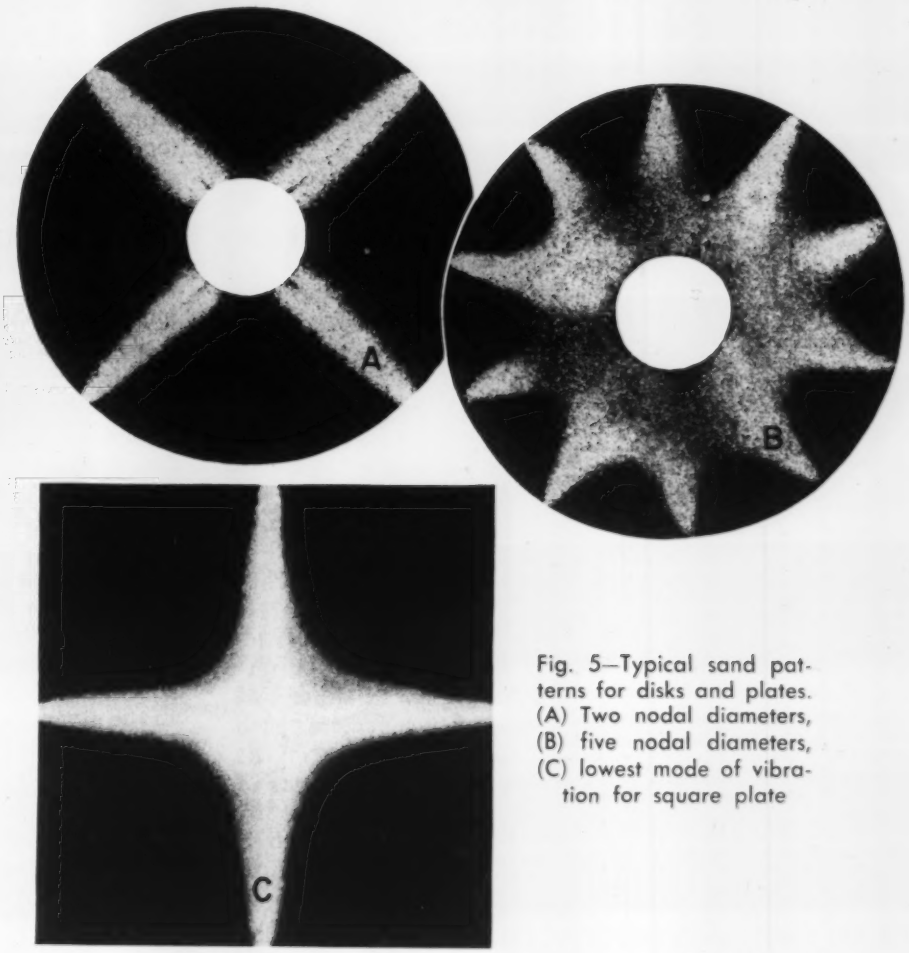

Fig. 5—Typical sand patterns for disks and plates. (A) Two nodal diameters, (B) five nodal diameters, (C) lowest mode of vibration for square plate

ve Wheels

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steel pin which vibrates the wheel by electromagnetic means over a range of frequencies until a frequency is found at which the wheel vibrates resonantly.

Mechanical "Ear" Involved—The human ear is replaced by a microphone which "listens" to the vibration of the wheel and is connected to an electronic circuit for determining the exact frequency of the tone.

Fig. 1 illustrates the work position station of a sonic testing machine arranged to measure rapidly and accurately the frequency of vibration of disk-like bodies such as grinding wheels of a size range from 3 to 20 inches in diameter over a frequency range of 100 to 10,000 cycles per second with an accuracy of plus or minus 1 per cent.

Four rubber-tipped studs may be placed in any of the holes in the cross-bars to accommodate wheels and rings of different radius and arbor hole dimensions. Fig. 2 shows a wheel in testing position on the four studs being contacted by the stylus of the electro-mechanical transducer or vibrator at the rear of the photograph.

Like "Radio Tuning"—In operation a wheel is placed in this position in contact with the vibrating stylus, which is driven by a calibrated variable frequency generator. A dial, controlling the output frequency of this generator, is manually rotated until a cathode ray tube shows a characteristic and readily identifiable pattern produced when resonance exists between the driving vibrator and the wheel.

This operation is similar to tuning in a radio station with an electric-eye tuning indicator tube, an operation easily mastered by unskilled personnel. It is to be observed that the action of the vibrating stylus is merely to excite flexural vibration in the wheel and not to penetrate or mar the surface of the wheel. The sonic test is a nondestructive test and produces no visible marking on the article.

Doesn't Measure But Compares—Like other nondestructive tests, the sonic test does not directly measure the grinding characteristics of abrasive products. It is a comparator which accurately indicates whether a number of supposedly identical wheels are "harder" or "softer" than a selected standard wheel, as well as how much harder or softer they are.

If the grinding characteristics of a specific type of wheel are known, the sonic test will indicate whether or not other like abrasive wheels are identical in bonded grade and hence will grind the same.

It is to be appreciated that while two identical bodies will manifest the same period of vibration, it is physically possible to construct two nonidentical bodies which will have the same vibrational period. In this instance, the simple sonic test described is unable to differentiate between the two.

By the same token, it is physically possible to con-

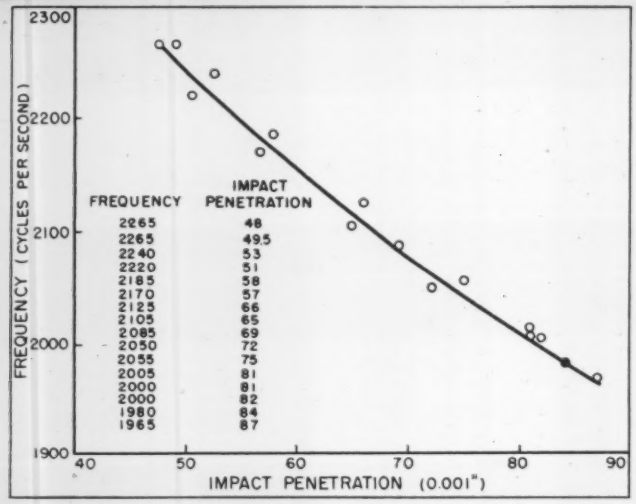


Fig. 6—Typical plot of impact penetration grade vs sonic frequency

struct two nonidentical bodies which will manifest the same penetration or attrition, such that a particular penetration or attrition test is unable to differentiate between the two. The readings of either test alone are significant only when other factors, such as composition, are known. A basic purpose of the sonic test is to compare the grade characteristics of any group of abrasive products manufactured by the same formula and method, a purpose which it accomplishes with economy, accuracy and dispatch.

Operation of Tester—Fig. 3 shows a sonic testing machine in plant operation for the routine grading of Carborundum brand and Aloxite brand abrasive wheels. The operator works mostly from a sitting position for greater comfort and efficiency. A platform full of wheels and an empty platform are wheeled to either side of the operator.

The operational procedure includes placing a wheel from the "ungraded" platform in testing position on the machine, adjusting the control dial until the characteristic resonance pattern appears on the cathode ray tube screen, reading the frequency from the calibrated dial of the generator, recording this frequency after the wheel number on an order tally card and placing the tested wheel on the "graded" platform. No sound-proof room is required, as the present sonic testers are capable of operation in relatively high ambient noise levels.

Procedure for Large Wheels—Present machine design enables the testing of wheels from 3 to 20 inches in diameter in the standard work position. Larger wheels may be tested by auxiliary supporting means because each machine is equipped with a portable vibrating stylus and portable microphone. One means involves hanging the wheel vertically from a fixed support through the arbor hole. For the lowest mode of vibration, the portable exciting stylus is applied at the wheel periphery at the end of a radius which is removed an odd number of 45-degree intervals from the vertical radius. In this manner, the point at which the wheel is supported corresponds to a vibration node and minimum damping occurs.

A further means involves stacking the large wheels in a horizontal position on platforms. Four wooden wedges may be driven between the top two wheels at points corresponding to 0, 90, 180 and 270 degrees around the periphery. When the wheel is excited at any one of the peripheral points corresponding to 45, 135, 225 or 315 degrees, the wedge locations correspond to nodes and vibration damping is minimized. After testing, the top wheel may be removed and the wedges moved to the next pair. Other nodal supporting locations will become apparent from studying the references, for with larger wheels higher modes are often employed.

Various Products Tested—Straight wheels, dished wheels, ring wheels, cup wheels, honing sticks, tiles and like products have been successfully tested. Bodies with a small diameter to thickness ratio may manifest fundamental periods beyond the frequency range of the instrument. For vitrified bond abrasives, as a rule of thumb procedure without laboratory tests to determine whether or not a usable period of vibration exists, if a body produces a good audible ring when struck with a hammer it is probable that it may be tested with little difficulty.

Aside from grading, and from flaw detection later to be described, the sonic test occasionally finds use in the separation of identical-appearing runs of wheels inadvertently mixed in handling, or in the identification of runs of wheels from which identifying marks or orders have been lost during transportation.

Further, the method may be employed to measure Young's modulus of elasticity or the degree of vitrification of a group of elastic bodies by measurements on one or more reguarly-shaped dummy bodies burned with the others.

Modes of Vibration—The theory of vibrating disks and plates, along with the characteristic modes of vibration of circular disks or square plates is beyond the scope of the present article and is fully reported elsewhere in the literature[2, 3]. However, to illustrate the mode of vibration employed in the simple grading of abrasive wheels, loose black silicon carbide has been uniformly distributed over the surface of a wheel as seen in Fig. 4 and the wheel excited at its lowest period of vibration by the exciting stylus. During some few moments of excitation, the loose silicon carbide is thrown from the areas of maximum vibration (antinodes) to the areas of minimum vibration (nodes) where it comes to rest.

Fig. 4 shows the grain pattern, or "sand pattern" as it is commonly termed, produced when the wheel is vibrated at its lowest mode. This is the mode most strongly excited when the wheel is supported for substantially undamped vibration and sounded, as by tapping with a hammer.

Comparing Figs. 1 and 4, it will be observed that the areas of minimum or zero displacement (nodal areas) for this lowest mode lie directly over the supporting studs, in a manner such that no vibrational energy is lost to the supports.

Damping Errors Not Likely—Further, the microphone which is employed to pick up the sound energy from the wheel is out of contact with it, in such a manner that no damping or frequency error is introduced as may be the case should direct-coupled vibration pickups be employed.

Figs. 5A, B and C illustrate the lowest and a

higher mode of vibration for abrasive wheels and the lowest mode for a square plate or tile. The nodal patterns were formed with white silica sand on a black silicon carbide abrasive wheel and tile.

Saves Expensive Edging and Facing—Frequency of vibration of any body is mathematically related to the dimensions of the body, as well as to its physical properties. In practice it has been found that wheels manufactured by certain processes are sufficiently close in dimension to enable sonic grading before edging and facing to uniform size. Thus, wheels which are off grade or cracked may be removed from the run before expensive edging and facing operations are performed. Other manufacturing processes may produce wheels of less dimensional uniformity, and in these instances the test may be applied after edging and facing. As a general rule, other grading methods are limited to application only after facing and not before, because surface irregularities obviously more seriously affect grading methods that are based upon surface penetration or attrition.

Generally speaking, variations in the arbor and radius dimensions represent such a small variation in the total arbor or radius dimension that the frequency of vibration is not seriously influenced. It is of interest to note that the presence of the lead bushing in wheels having a large diameter to arbor ratio, produces little if any effect on the frequency of flexural vibration.

In certain types of thin wheels, in which the thickness tolerances are broad and yet unusually close limits on grade accuracy are required, a simple correction for thickness inequalities easily is applied from knowledge that the frequency of flexural vibration is directly proportional to the thickness dimension.

Impact vs Sonic Grading — Fig. 6 illustrates a typical plot of impact penetration grade in thousandths of an inch vs sonic frequency in cycles per second. In the impact test, depth of penetration in thousandths of an inch of a rectangularly shaped hardened tool is measured after it has been dropped a predetermined number of times through a fixed distance upon the flat surface of the abrasive wheel.

Graphs of this type indicate that an excellent correlation exists between the two methods, at least for grit sizes of the order of 36 and finer. For larger grit sizes, of the order of 20 and coarser, a poorer correlation is obtained, presumably because the accuracy of the impact test is impaired when the grit diameter approaches the impact tool dimensions. In experiments of this type it has been observed that the greater the number of impact holes which are averaged in securing the impact penetration, the greater the tendency for all points to fall on a smooth curve. This result might be predicted from recognition of the fact that the sonic test averages the wheel grade; whereas, the impact test gives the grade at the point under the impact stylus.

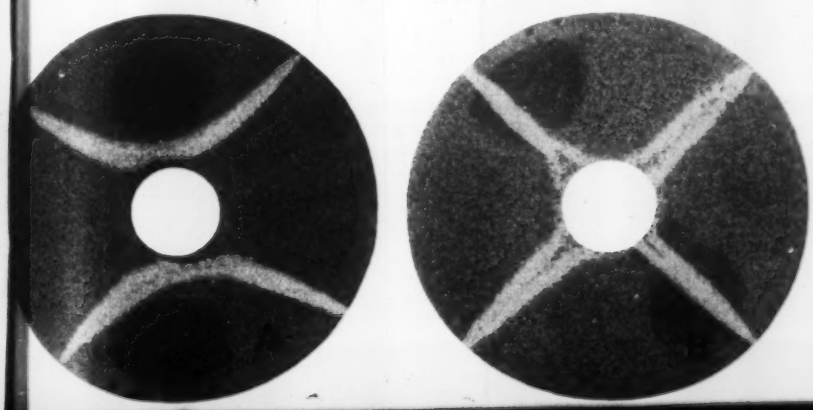
However, the average grade provides no information as to possible nonuniformity of structure within the abrasive body; hard or soft areas or hardness differences between opposing wheel faces may pass undetected. A localized test such as the impact test is useful if any such nonuniformity is suspected. If desired, the impact test may be carried out on a few wheels from each lot being sonic tested to provide a correlation with established data relating such impact grade test results with grinding behavior.

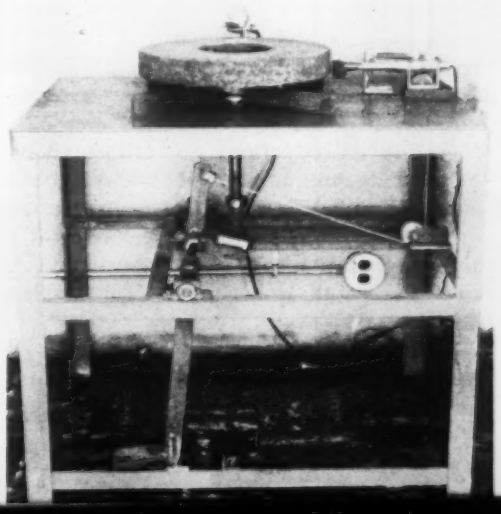
Flaw Detection with Sonic Testing—In supposedly identical bodies, all excited at resonance with a constant driving power, the amplitude of vibration of each body is inversely proportional to the amount of internal energy absorbed in the body. The internal energy consumed is related to the number, type and extent of flaws, cracks and fissures.

Total vertical height of the resonance pattern on the standard sonic testing machine is proportional to the amplitude of vibration of the abrasive wheel being tested. Therefore, in the routine sonic grading of a run of supposedly identical abrasive articles, if the amplitude of vibration of one or more of the articles is widely different from others in the run the operator is warned that such articles may have internal cracks or flaws.

Similarly, the frequency of vibration of the body is affected by cracks, flaws, fissures and other inhomogeneities. Therefore, in the routine sonic test if either the frequency or amplitude of vibration of one or more of the articles in the run is widely different from others, those few articles may be submitted to inspection by supplemental means before placement in a different (*Please turn to Page* 84)

Fig. 7 (below)—Nodal distortion and dual frequencies produced by dense area. (A) 1400 cycles per second, (B) 1425 cycles per second
Fig. 8 (right)—Flaw detection fixture for larger wheels. This is connected to regular sonic testing machine





Watch Your Surface Finish

Development of geometric surface finish standards in General Motors and Chrysler research laboratories will assist surface finish control in many manufacturing operations

PART II

INCREASING confidence is being shown by both engineers and production men in the specification and production of controlled surface finishes. However, the question still remains what is the physical depth of a microinch of roughness, since there has been no physical standard by which we can measure roughness and be sure the results are comparable from shop to shop.

Recently, the research and development groups of General Motors and Chrysler conducted work aimed at development of such a standard. Studies indicated that an artificially prepared surface would best serve the purpose of defining surface roughness. Machined surfaces were considered but rejected because of their inherent variability.

According to plans worked out, the artificially prepared surface standard was to have the roughness ruled on and there were to be sufficient of these ruled surfaces to cover the full range of recommended roughness values. It is planned that such accurately prepared surfaces will be used to calibrate instruments which are used in surface finish measurements.

Ruling Machine Built—General Motors' research laboratories designed and built a ruling machine for ruling geometric standards. The angle of 150 degrees was chosen for the basic angle of the grooves, to allow deep penetration by the stylus-type measurement instruments described. Spacing of the rulings is held between 0.008 and 0.0002-inch. According to a report[1] from the GM research laboratories, with the above limitations, using the variety of ruling pitches available from the ruling machine, surfaces with roughness values from 1000 microinches down to 25 microinches can be ruled by the 150 degree diamond.

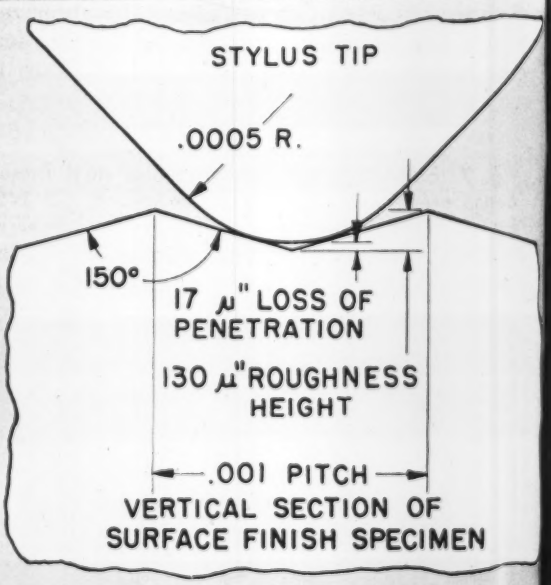
Specimens ruled are 2 x 3-inch blocks of silver-clad steel, on which 0.005-inch of gold is plated. The surface is then polished to a roughness of about one microinch average. The specimens are ruled and then reproduced by the electroforming method. The second generation reproductions are calibrated by taper sectioning, a technique applied to this problem by C. R. Lewis, Chrysler Corp. research laboratories. If the replicas prove to be within 5 per cent of the nominal value, and if the rulings are consistent and without flaws, the patch is acceptable for further reproduction.

This system of reproduction of all the replicas from one master fixture automatically insures that every user of the specimens will be employing the exact duplicate of every other set. With a large distribution of the geometric standards the uniformity of surface finish control should improve many fold over present controls.

Uses of Standards—During past years, many individual manufacturers made sets of machined surfaces for use as surface finish standards. The many uses found for these sets indicated the need for physical standards of surface finish. However, they all presented a number of serious disadvantages. One is the difficulty involved in judging by appearance the comparative roughness of two surfaces differing from each other appreciably in either shape or material.

Since to the eye, the roughness of a surface influences only the way in which it reflects light, alterations in the large-scale geometry of the surface, and changes due to the varying reflectivity of different materials, may be judged to be changes in surface finish, and precise visual comparisons between such differing surfaces are extremely difficult to make. In making a set of surface finish specimens, it is possible in only a few cases to have a sufficient number of specimens to make comparisons with all the surfaces being produced. For this reason, most ma-

Fig. 18—To allow deep penetration by the stylus-type measurement instruments, a 150-degree angle was chosen for the basic angle of the grooves in the geometric surface finish standards using a ruling



chined surface finish comparison sets are found inefficient when attempts are made to use them for precise control of surfaces. For coarse control of noncritical surfaces, however, such a set is frequently quite helpful.

If the attempt is made to use such a set of machined surfaces for instrument comparison, a further trouble develops. These machined surfaces cannot be made to extremely close tolerances. It has been pointed out that a set of specifications proposed by the ASA for such a set of comparison surfaces calls for tolerances in average roughness of the whole surface ranging from 10 to 30 per cent. Further, individual measurements on a particular spot will vary even more widely than this on most machined surfaces.

Reference Standards—Use of the geometric surface standards is expected to overcome these difficulties. Although actual shop experience is needed before they can be utilized most efficiently, it appears, at present, that the use will fall primarily into two categories. Since they are about one order of magnitude more accurate than any physical standards of surface roughness available at the present time, they should serve as reference standards for surface finish measuring instruments, in much the same way that gage blocks are used for calibrating length-measuring instruments.

By using them as instrument calibrators, no question need arise as to the equivalence of measurements taken at widely differing places or times. When checked regularly with the geometric standard surfaces, instruments now in use will readily show any departure from calibration. This problem is now rather serious.

Availability of the geometric standard surfaces will encourage the design and production of new instruments relying on the standard surfaces completely for their calibration. It is reported that one of the larger manufacturers of measuring instruments is negotiating for the use of these surfaces for calibration, and has indicated that such use will reduce the initial cost of the instrument by nearly one-half. A gage company is engaged in the development of a surface roughness measuring instrument utilizing a principle not previously applied in this field, and is similarly depending on the geometric standard surfaces for calibration. It is expected that further developments of this kind will occur when the geometric surfaces become more widely available.

Preparation of Shop Samples—Second main use of the geometric surface finish standards is expected to be in the preparation of shop standards. It was explained above that one of the weaknesses of present day surface finish blocks is their inability to reproduce the shape and material of the surface to be controlled. If an actual sample of a part being manufactured is used to provide the comparison control surface, this objection is removed. Although at least one large manufacturer is using such a system at present, difficulties in establishing the exact roughness of the comparison standard have kept this method from being widely adopted.

With the geometric surface standards available, there will be no difficulty in preparing shop samples to engineering specifications, and insuring that the samples are uniform both in different locations and at different times. If a large-scale production process is being controlled, a shop sample can be duplicated by the methods used to prepare the geometric standards, and the replicas distributed as widely as may be desired. It has been reported that such work piece standards will be relatively inexpensive, and will enable direct comparison to be made between a surface being produced and a specified surface. When critical control is not needed, visual comparison will probably be sufficient in such a case for production surfaces. Where more precise control is necessary, direct instrument comparison can be made with no chances of error due to (*Please turn to Page* 90)

machine that was designed and built by General Motors research laboratories

Fig. 19—Geometric surface finish standards in one of the assembly fixtures

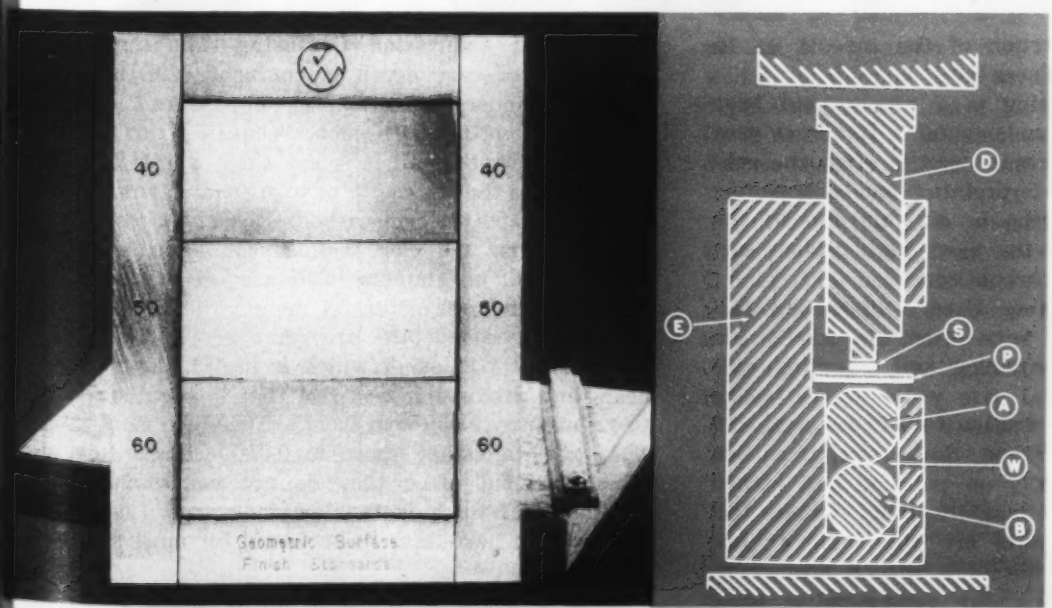
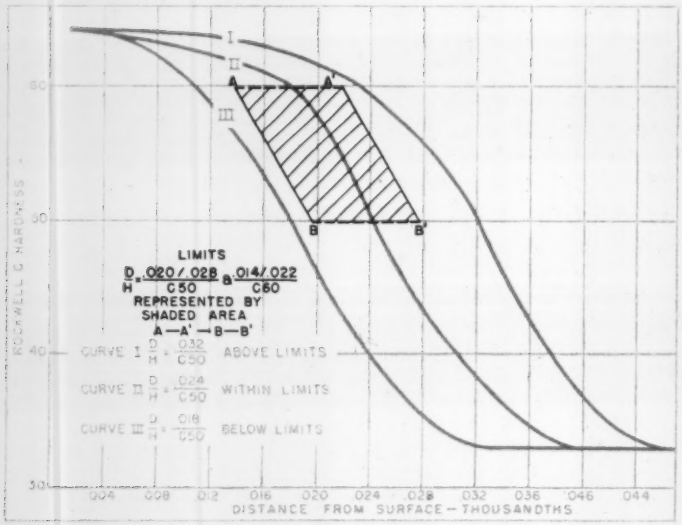
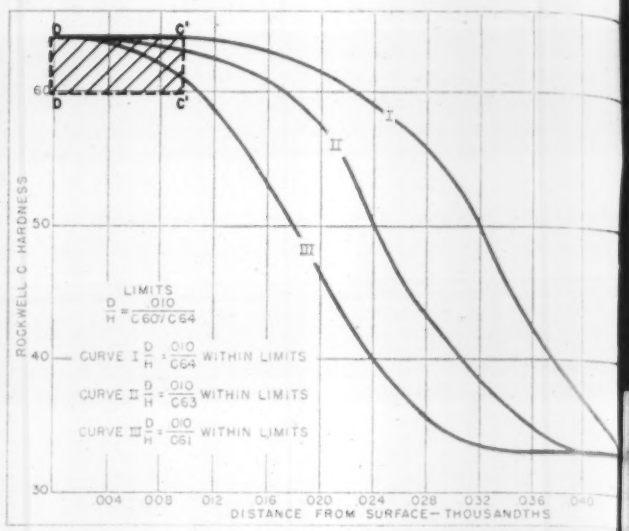


Fig. 20—Equipment for impressing surface replicas into photographic emulsions. Method brings out three-dimensional nature of specimen surface. (A) ¾-inch steel ball with ¼-inch flat ground on, (B) free-turning ¾-inch steel ball, (D) plunger, (E) supporting frame, (P) photographic film or plate, emulsion up, (S) specimen under study, prepared face down, (W) grease-filled well


ROCKWELL C HARDNESS
LIMITS
D/H = .020/.028 C50 & .014/.022 C60
REPRESENTED BY SHADED AREA A—A'—B—B'
CURVE I D/H = .032/C50 ABOVE LIMITS
CURVE II D/H = .024/C50 WITHIN LIMITS
CURVE III D/H = .018/C50 BELOW LIMITS
DISTANCE FROM SURFACE—THOUSANDTHS


ROCKWELL C HARDNESS
LIMITS
D/H = .010/C60/C64
CURVE I D/H = .010/C64 WITHIN LIMITS
CURVE II D/H = .010/C63 WITHIN LIMITS
CURVE III D/H = .010/C61 WITHIN LIMITS
DISTANCE FROM SURFACE—THOUSANDTHS

Figs. 1 and 2—Hardness penetration curves showing depth and degree of hardness

How To Determine Case Hardenability

Metallurgists and laboratory technicians will welcome this simple new method for determining accurately and rapidly useful case depth on hardened specimens. Procedure also can be applied to measurement of decarburization depth to cyanided and nitrided cases as well as to surfaces hardened selectively by induction or flame hardening techniques

By RICHARD F. HARVEY
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Brown & Sharpe Mfg. Co.
Providence, R. I.

RAPID, accurate, reproducible method of determining and designating the useful portion of hardened case depths proposed here may fulfill the needs of metallurgists and laboratory technicians for a test more reliable than current estimating procedures. The technique consists of determining by microhardness tests what portion of the case is up to and over the desired hardness level.

Although case hardening is a widely used heat treating procedure, so fundamental a factor as case depth is difficult to determine and is often the subject of considerable misinterpretation and controversy. Estimation of case depths is difficult due to the gradual transition from the hard, high carbon surface to the soft, low carbon core.

Unrelated Methods Now Used—Different metallurgists or laboratories very often use wholly unrelated methods of determining and reporting case depth. Some report total case while others try to estimate the carbon penetration to 0.40 per cent and others to 0.50 per cent carbon. Some estimate carbon penetration microscopically on polished and etched specimens at 50 or more magnifications. Others feel that more accurate results are obtainable at low magnification with the use of a Brinell microscope at 10 magnifications, whereby estimation is made of the depth of transition from a brown to blue color.

Even when metallurgists and laboratory technicians use identical methods and have the same interpretation of case depth, it is not uncommon for results of different determinations of the same sample to vary by as much as 25 per cent.

Numerical Expression Confusing—The numerical expression of case depth is confusing and is commonly misunderstood. Suppose we are told a part has a case depth of 0.040-inch. What does this actually mean? First of all it is not clear whether reference is made to total depth or to some arbitrary depth such as to 0.50 per cent carbon. Electroplate, galvanized coatings, and clad metals such as rolled gold plate, alclad, or stainless clad are all expressed in terms of thickness of useful metal.

However, case depths are often reported as total case, only a portion of which is useful. Many engineers and production men feel that it is satisfactory to grind away 0.030-inch from a 0.040-inch total case. They maintain that there is 0.010-inch case depth remaining, but often they do not understand that the last 0.010-inch is too low in carbon (and consequently in hardness) to be useful for most applications.

Simple Procedure—In view of the limitations of

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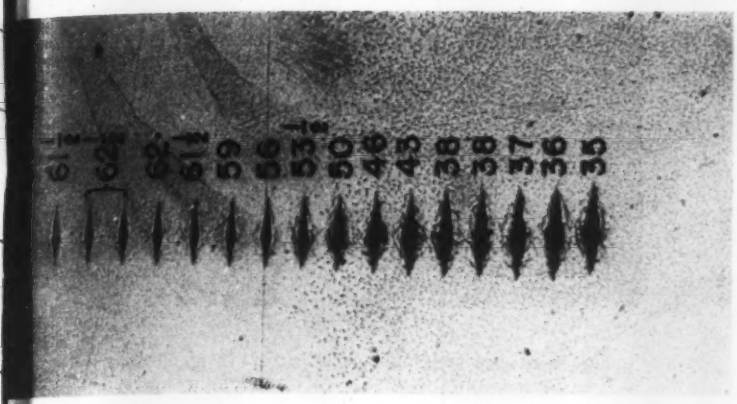

Fig. 3—Photomicrograph representing Knoop microhardness traverse of a case-hardened shaft ¼-inch round made from AISI 8615 steel, carburized in bone at 1460°F for 9 hours followed by oil quenching. 50X

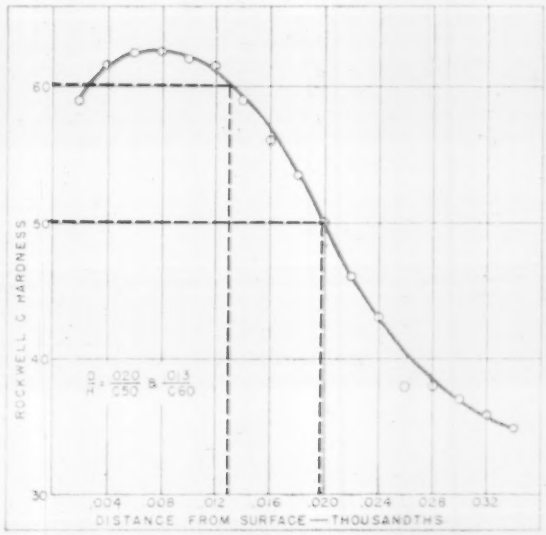

Fig. 4—Hardness penetration curve for specimen shown in Fig. 3

present methods, the writer proposes to set up a simple procedure for accurately and rapidly determining the case depth on hardened specimens to a specified, useful, hardness level. This can be done rapidly and accurately by several microhardness determinations in the transition zone to determine what depth of hardened case is, for example, over Rockwell C50.

Anything softer than this is not generally considered useful for most applications. For many applications it is also desirable to know what portion of the case is over Rockwell C 60 or any other hardness level. These can be determined conveniently.

"Case Hardenability"—Depth and degree of hardness in case hardened work can be expressed as the "DH" value in which "D" stands for depth and "H" stands for hardness. The term "case hardenability" is proposed to designate the characteristics that determine depth and distribution of hardness in case hardened work.

Referring to curve I, Fig. 1, the total case depth is about 0.046-inch. That portion of the case over 50 Rockwell C is 0.032-inch and that portion over 60 Rockwell C is 0.023-inch. It is thought to be more informative to refer to a 0.032-inch depth of useful case over Rockwell C 50 than to a total case depth, much of which has no value. This may be expressed symbolically as follows:

$$\frac{D}{H} = \frac{0.032}{C\,50}$$

This expression indicates that 0.032-inch of the case depth is 50 Rockwell C or over. Similarly the following expression states 0.023-inch is 60 Rockwell C or over:

$$\frac{D}{H} = \frac{0.023}{C\,60}$$

These expressions may be combined as follows:

$$\frac{D}{H} = \frac{0.032}{C\,50} \text{ and } \frac{0.023}{C\,60}$$

Curves II and III in Fig. 1 may be designated as follows using the symbols described:

Curve II

$$\frac{D}{H} = \frac{0.024}{C\,50}$$

$$\frac{D}{H} = \frac{0.018}{C\,60}$$

Curve III

$$\frac{D}{H} = \frac{0.018}{C\,50}$$

$$\frac{D}{H} = \frac{0.011}{C\,60}$$

In each instance the D value or depth is the numerator and the H value or hardness is the denominator. Knoop microhardness values have been converted to the more familiar Rockwell C values in the illustration. However, the intention of limiting this method to Rockwell C values is disclaimed, as Knoop or any other hardness values can be used. In fact, greater accuracy is obtainable by using microhardness values directly without converting.

Rockwell Tests Used—The microhardness tester has been found to be a convenient means of determining the depth of useful case. However, these principles may be modified to permit use of Rockwell hardness tests on taper ground specimens such as are now used by some plants.

In Fig. 1, the line connecting points A-A′ informs us that the transition from above to below 60 Rockwell C must come between these points, and that at depths shallower than 0.014-inch the hardness must be greater than 60 Rockwell C while at depths deeper than 0.022-inch the hardness must be less than 60 Rockwell C.

Similarly the line connecting points B-B′ shows that the transition from above to below 50 Rockwell C must come between these points, and that at depths shallower than 0.020-inch the hardness must be greater than 50 Rockwell C while at depths deeper than 0.028-inch the hardness must be less than 50 Rockwell C.

Thus we may have specified limits of:

$$\frac{D}{H} = \frac{0.020/0.028}{C\,50} \text{ and } \frac{0.014/0.022}{C\,60}$$

Curve II will be observed to be within the specified limits while curve I is above, and curve II is below the specified limits.

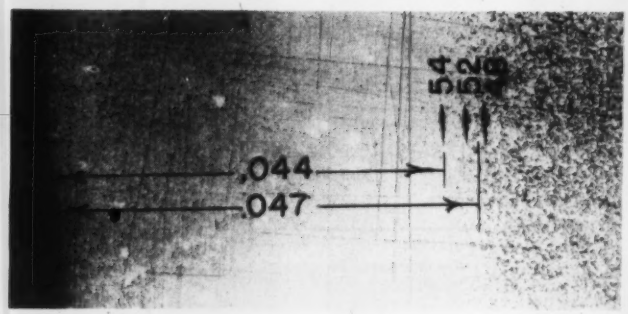

Fig. 5—Hardened case of AISI 8615 steel 1-inch round, pack carburized at 1600°F for 12 hours, hardened in brine at 1450°F. Case over 50 Rockwell C. 50X

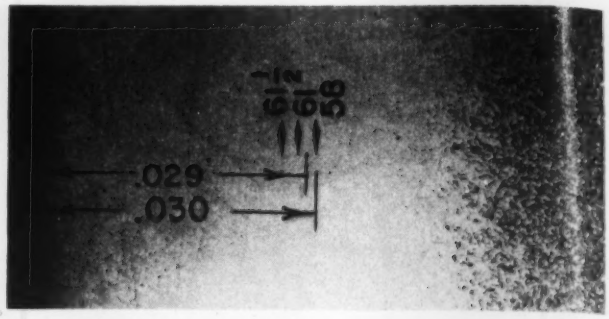

Fig. 6—Same specimen as Fig. 5. Determination of hardened case over 60 Rockwell C. 50X

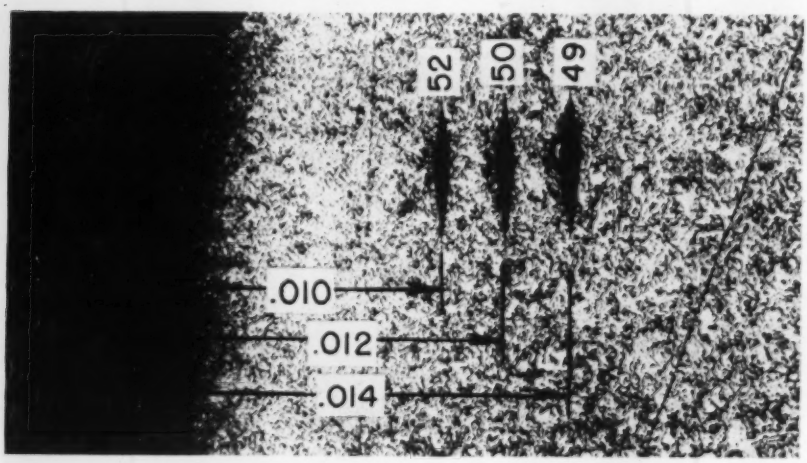

Fig. 7—AISI 8615 steel ½-inch round, liquid salt carburized, 1700°F, ½-hour, quenched in brine. Case over 50 Rockwell C. 150X

Alternate Method—If we are interested in the harder portion of the case, an alternate method of designating case hardenability may be used. Fig. 2 shows the same three curves as Fig. 1.

The depth hardness characteristics of these three curves may be expressed symbolically as follows:

$$\text{Curve I} \quad \frac{D}{H} = \frac{0.010}{C\,64}$$

$$\text{Curve II} \quad \frac{D}{H} = \frac{0.010}{C\,63}$$

$$\text{Curve III} \quad \frac{D}{H} = \frac{0.010}{C\,61}$$

These simplified expressions tell us that in curves I, II and III the hardness at 0.010-inch below the surface is Rockwell C-64, 63 and 61 respectively.

For limits the following is cited:

$$\frac{D}{H} = \frac{0.010}{C\,60/C\,64}$$

This expression states that at 0.010-inch below the surface, the hardness shall be between Rockwell C 60 and Rockwell C 64. It will be observed that curves I, II and III are within the limits cited.

While the line C-C′ in Fig. 2 refers to a hardness at a depth of 0.010-inch only, if desired, limits can also be set up in terms of hardness up to a depth of 0.010-inch and represented schematically by the area CC′-DD′.

Complete Microhardness Traverse—Fig. 3 represents a Knoop microhardness traverse of a case-hardened shaft ¼-inch round made from AISI 8615 steel. This was carburized in bone at 1460° F for 9 hours followed by oil quenching. Fig. 4 represents the hardness penetration curve for this specimen. At 0.013-inch below the surface the hardness is Rockwell C 60 and at 0.020-inch below the surface the hardness is Rockwell C 50. This we may express as follows:

$$\frac{D}{H} = \frac{0.020}{C\,50} \text{ and } \frac{0.013}{C\,60}$$

While a complete microhardness traverse is illustrated in Fig. 3, it is neither necessary nor desirable to make so many determinations to establish the case characteristics. If a few microhardness tests are made in the transition zone between the hardened case and soft core, as illustrated in Fig. 5, the depth of case of 50 Rockwell C or over can be quickly determined.

Fig. 5 taken at 50 magnifications illustrates the hardened case of AISI 8615 steel 1-inch round heat treated as follows:

Pack carburized 1600° F—12 hours
Hardened 1450° F—brine
Not tempered

Three microhardness readings were taken starting at a depth of 0.044-inch and in steps of 0.002-inch thereafter. It will be evident that the portion of the hardened case above 50 Rockwell C extends to a depth of 0.047-inch. This can be expressed symbolically as follows:

$$\frac{D}{H} = \frac{0.047}{C\,50}$$

Similarly the depth of hardened case over 60 Rockwell C can be rapidly determined. Experience has shown that about two thirds of the hardened case above Rockwell C 50 is usually also above Rockwell C 60. Fig. 6 taken at 50 magnifications on the same sample shows three microhardness readings taken 0.002-inch apart at distances of 0.026-inch, 0.028-inch and 0.030-inch from the surface. That portion of the hardened case above 60 Rockwell C is 0.029-inch. This may be expressed as:

$$\frac{D}{H} = \frac{0.029}{C\,60}$$

Additional Hardness Checks—In making microhardness explorations in the transition zones of 50 or 60 Rockwell C hardness it will save time to determine the hardness of one point at the estimated hardness level. The additional hardness checks can be made at 0.002-inch intervals at shallower or deeper depths as may be required.

For example in Fig. 6 which illustrates the determination of the portion of hardened case above Rockwell C 60, the first hardness reading, taken at 0.030-inch from the surface, was determined to be equivalent to Rockwell C 58. Then two additional de-ter-

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You can check right now, step by step, the numerous ways this precision cold rolled strip will cut your fabricating costs. First, you'll gain more yield from Thinsteel because gauge tolerance is under the CMP skilled and vigilant control that assures maximum feet per pound. But that's only part of the story—you can walk into more profits, too, with CMP's adherence to your toughest specifications, in coil after coil, to reduce scrap and lessen rejects; often overlooked is the advantage CMP long coils provide (up to 300 lbs. per inch of width) to reduce costly down time. So, if you're interested in more finished parts per ton (which translates into more profit per unit) the next step should be a call or letter to CMP—you'll get immediate and interested attention.

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minations were made at 0.028-inch and 0.026-inch from the surface resulting in Rockwell 61 and 61½ respectively thus establishing that 0.029-inch of the hardened case in Rockwell C 60 or higher.

Fig. 7 represents the case at 150 magnifications on a specimen of AISI 8615 steel, ½-inch round heat treated as follows:

Liquid salt carburized 1700° F—½ hour.

Brine quenched—not tempered.

This illustrates a poorly defined case which would be difficult to estimate microscopically or visually. Microhardness readings taken in the transition zone at a depth of 0.010-inch, 0.012-inch, and 0.014-inch show hardness values corresponding to Rockwell C 52, 50 and 49 respectively. We may express the useful portion of the case which is 50 Rockwell C or above as:

$$\frac{D}{H} = \frac{0.012}{C\,50}$$

The method described is also applicable to the measurement of depth of decarburization. Partial decarburization on high speed steel bars, ordinarily a difficult determination, can be conveniently measured by using this method.

For reproducible results, the size of test specimen or actual part as well as the material and conditions of case hardening should be stated.

It is realized that for many applications present methods of estimating case depth are adequate and should be continued to be used. For those applications where something more precise than an estimate is required, the method described should fulfill that need.

This method is also more broadly applicable to cyanided and nitrided cases as well as to surfaces hardened selectively by induction or flame hardening. Another important field where this technique is applicable is in the determination and expression of hardenability of tool steels.

Sonic Tests Grade Wheels

(*Concluded from Page 77*)

grade category or shipment to the customer.

Test Can Be Modified—In addition to the ability of routine sonic grading to detect certain types of flaws, simple modifications of the routine test may be employed to improve its sensibility to such inhomogeneities.

For example, photographs A and B of Fig. 7 illustrate an abrasive wheel purposely made with two dense areas indicated by the dark circular markings. This wheel exhibits two lowest-mode periods of vibration; one at 1425 and the other at 1400 cycles per second. If the supporting studs are located near the edge of the arbor hole to minimize vibration damping at either frequency, either frequency may be excited. The sand patterns indicate the distortion of the nodal lines produced by the dense areas, but are not normally employed after the test has progressed from the laboratory to the plant. It is to be observed that only one, rather than two, dense areas will produce an analogous node distortion and frequency difference.

This dual-frequency characteristic also is produced by unhealed cracks and represents a sensitive method for their detection. Thus, if a small portion of the frequency spectrum is scanned, as by rocking the dial of the variable frequency generator, the presence of two relatively nearby resonant periods or an unusually broad resonance indicates the presence of some type of inhomogeneity.

Fig. 8 shown a supplementary flaw-detection fixture for connection to a standard sonic testing machine, in which depression of a foot pedal retracts the stylus and raises the wheel on a rotatable spindle to permit manual orientation of the wheel with respect to the stylus and supports. Cracked wheels manifest two, and generally only two, neighboring frequencies for the lowest-mode of vibration; either of which may be accentuated by placing the supports to damp the undesired frequency.

A further flaw detection method involves measuring the frequencies of the lowest and of higher order modes of vibration and comparing the ratios of these frequencies with the ratios for theoretically perfect disks. These procedures, among others indicate how the sonic method for flaw detection extends the scope and utility of the sonic grading system.

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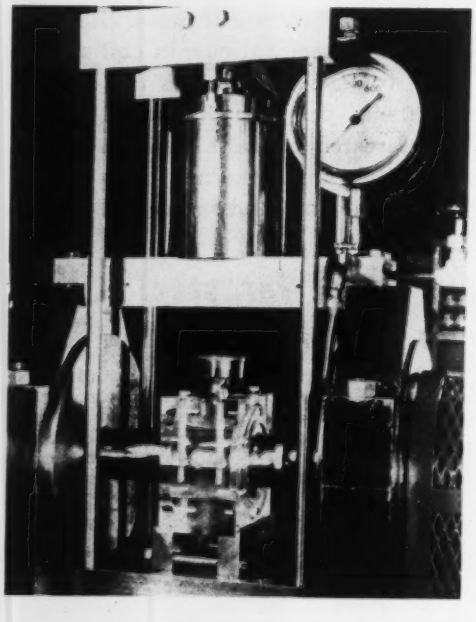

BEHAVIOR NOTED THROUGH PLASTIC: Ability to see and photograph the behavior of oils and greases in bearings under different loads and speeds is imparted to lubrication engineers of Texas Co. through the use of transparent plastic bearings. Bright red dye is mixed with the lubricant so that flow lines can be followed. Sensitive scales on the test machine, built at the company's Beacon, N. Y., laboratories, measure the tendency of bearing to rotate with the shaft. Although plain journal bearing is under test at present, machine can be adapted to study ball, roller bearings

Measuring Tin Plate Weight

ACCURATE determination of the weight of tin coating on tin plate is possible with a time saving process developed by research department of Continental Can Co., New York. Said to be inexpensive, process has been made available, license free, to the entire industry.

Process involves the removal of tin from tin plate by electrolytic deplating, followed by titration of the resultant stannous tin-bearing solution to give accurate measurement of the tin deposit on any given sample of tin plate. The entire process takes but a few minutes and is said to be equally adaptable for quality control of tin plate made by both the hot-dip and electrodeposition methods. It was developed by G. H. Bendix of Continental.

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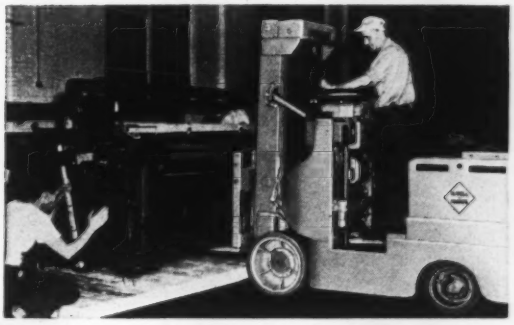


Lowering heavy loom, truck operator "spots" it just right over bolts on bottom of export case. Truck does job in minutes—manually it took much longer and was hazardous.

Precision HANDLING BY ELWELL-PARKERS

Big loads—valuable loads—delicate loads—*all* can be handled with safety, speed and precision on easily handled, highly maneuverable Elwell-Parker trucks. Elwell-Parker's refined engineering, precision construction and precautions against wear make this possible. Simple finger-tip controls give operator complete mastery of the truck at all times. Inching action, plus a smooth, steady flow of power, also helps Elwell-Parkers perform exacting operations like the examples shown. For further evidence of the superiorities of Elwell-Parkers and their ability to cut *your* handling costs, call in your near-by EP man. The Elwell-Parker Electric Co., 4103 St. Clair Ave., Cleveland 3, O.

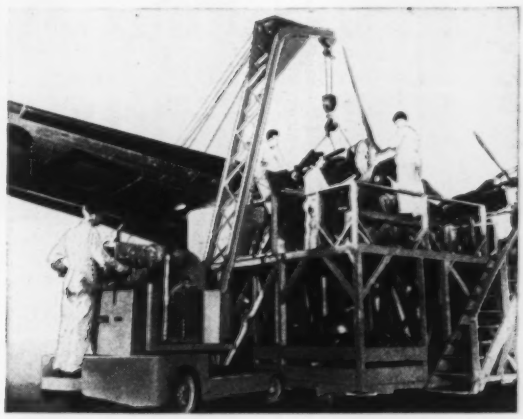
ELWELL-PARKER

POWER INDUSTRIAL TRUCKS

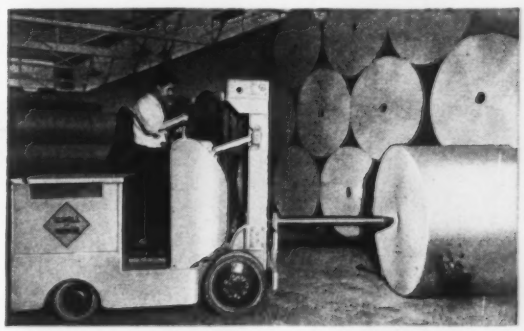
Established 1893

FREE BOOKLET on Scientific Materials Handling. Ask for "Industrial Logistics" and name your product.

Close-up of crane truck placing steam turbine rotor into the casing. Positioning within a fraction of an inch is achieved without damage to machinery.

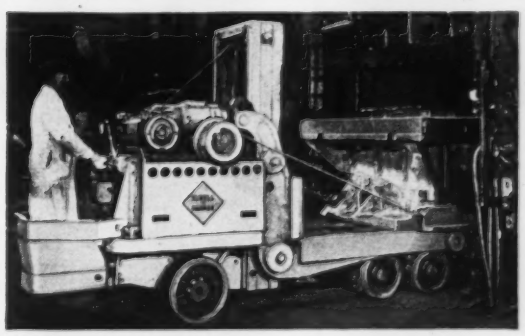


Special Elwell-Parker crane truck lowering a heavy bomber engine into place. Compared to previous methods, the job is done almost twice as fast, and with less manpower.



Picking up rolls on ram—an exacting job, and even more difficult when handling the high-tiered rolls—is readily performed by this E-P fork truck. ¼" difference in size of ram and hole.

Here's *PROOF* of Elwell-Parker's ease of handling. This amputee driver, with suitable attachment, is "as competent as any two-handed driver" spotting load on movable base.



Placing 50,000 lbs. automotive dies on and off presses—formerly difficult and hazardous—is securely and swiftly done by precision-controlled E-P die handlers.

New Signal System Raises Blast Control Efficiency

By R. H. WHITE
Assistant Superintendent Blast Furnaces
Carnegie-Illinois Steel Corp.
Youngstown, O.

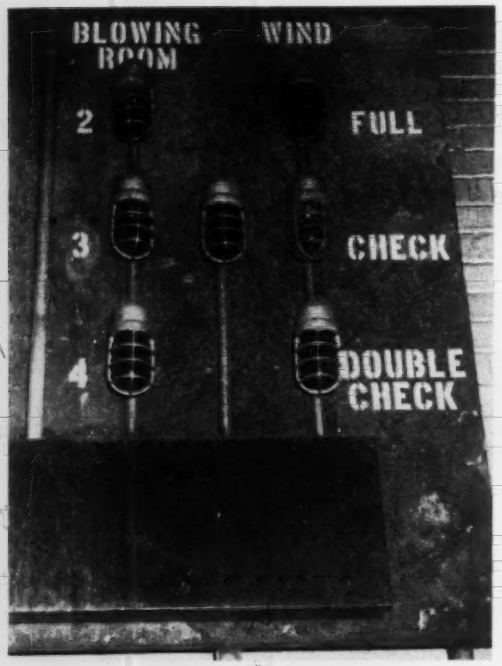


Fig. 1—Panel board located at cast house with seven lights to indicate blower's instructions to blowing engineer

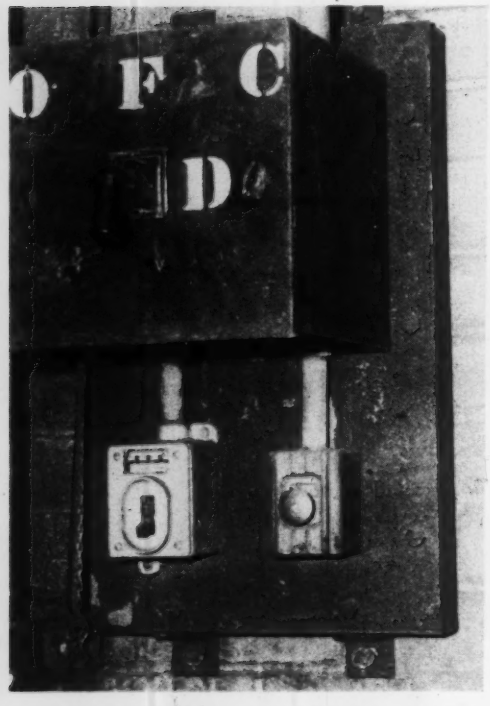


Fig. 2—Four-position switch for signaling wind requirement to the engineer

GRADUAL increase in the size of blast furnaces throughout the entire steel industry during the past few decades necessitated greater blowing capacity and more blowing rooms of larger size and frequently at a greater distance from the furnace. This in turn increased the number of cold blast valves and made the operation of blowing rooms of major importance to all blast furnace personnel.

To effect a tie-in between the furnace foreman and blowing engineers in former years, a one-way signal system was introduced which consisted of an electric switch at each cast house that in turn operated a solenoid-operated steam whistle in the blowing room. Adjustment of the whistle tone indicated to the blowing room engineer the furnace which was requesting the change in wind conditions, the degree of change being determined by the number of blasts of the whistle. This system provided no way for the engineer to answer the furnace; consequently, the furnace foreman had to watch the pressure chart to determine if the signals had been executed.

System Improved—By the addition of a signal light at the furnace so the furnace operator could tell if the whistle blew. But with this system the furnace operator did not know if the blowing room engineer received the signal until he saw the pressure indicator change. An improvement on this system was to put a return whistle to the furnace to acknowledge receipt of the message.

Some plants, in order to still better the system, installed telephones in each cast house and blowing room. These were on the regular plant P.A.X. system. This was good except in emergencies when the line was busy. The telephone system was further improved at another plant where officials installed a direct phone system which connected the furnace operator with the blowing room engineer who was controlling the wind for his furnace.

All of these systems show gradual improvements made throughout the industry to obtain positive signals between furnaces and blowing rooms but in spite of all these betterments, explosions and fires still occur in the cold blast main.

Future Safety—To guard against occurrences of these dangers the blast furnace and coke oven committee of the Carnegie-Illinois Steel Corp. has formulated the following recommendations:

1. A signal system for conveying wind change requests direct to the blast source with provision for a 2-way transmission for signaling and an alarm that continues until acknowledgement is made. This is complete with battery operation or standing power and is self-checking. To verify establishment of connection between a blast furnace and its desired blowing position, and to sound an alarm if wire channel failures occur.

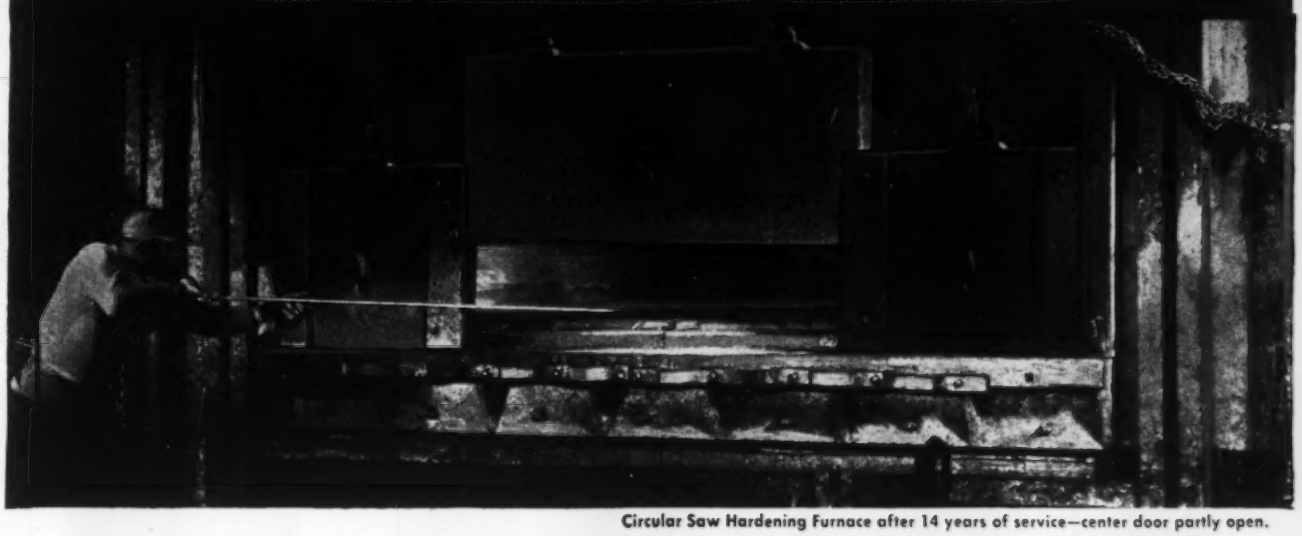
2. Low-pressure alarms consisting of pressure switches in all cold blast mains on blowing room side of snort valve, audible alarms in suitable locations and signal lights in conspicuous places to indicate that power is available on the alarm system, that the pressure switch has closed on low pressure and that low-pressure conditions still persists after the audible alarm has been silenced by the operator during periods when the line has been purposely depressurized. The low-pressure alarms have separate battery operation where dependable line service is not available, and a positive periodic checking procedure for lights, pressure switch and audible alarm.

3. High blast temperature alarms consisting of thermostatic switches, contact-making thermometers or equivalent, with audible and visual alarms, actuating from a point on the cold blast main adjacent to the furnace snort valve on the blowing engine side. Procedures for the periodic testing of these devices must be developed.

4. An intercommunication system providing independent communication between furnace front and blast source; where desirable and practical a public address system is satisfactory.

At the same time the previously-mentioned committee was making its investigations and forming the recommendations, Carnegie engineers in Youngstown, O. were designing an improved signal system, for installa-

Not One Cent for Maintenance IN 14 YEARS OF SERVICE

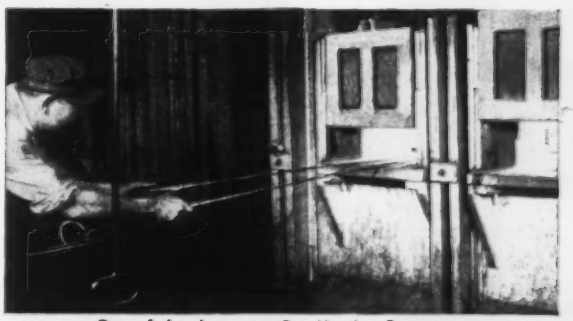


Circular Saw Hardening Furnace after 14 years of service—center door partly open.

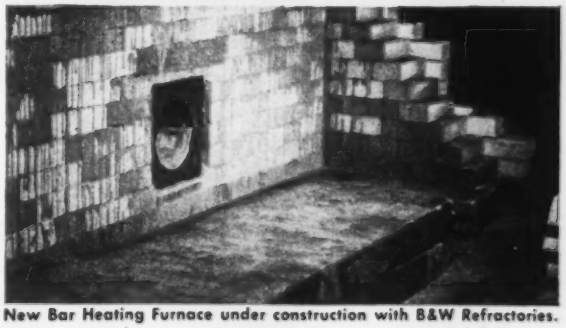
THAT'S THE RECORD of B&W Insulating Firebrick in Henry Disston and Sons, Inc. circular saw hardening furnace. During 14 years, this furnace handled hundreds of tons of high grade steel. *Despite this grueling punishment, the original walls and roof of B&W Insulating Firebrick are still giving excellent service.*

B&W IFB not only made possible continuously high production, but also assured better quality control . . . due to the quick response of this brick to temperature changes. And because B&W IFB have such a very high insulating value, the fuel savings over the 14 year period were appreciable.

Performance pays off. As a result of this performance, Disston has since lined ten more furnaces of different types with B&W IFB. If you, too, want to increase furnace operating efficiency and lower production costs, discuss your refractory problems with your local B&W representative.



One of the three new Bar Heating Furnaces.



New Bar Heating Furnace under construction with B&W Refractories.

Furnace Specifications

Span of arch 13 ft. consisting of 9 in. K-26 IFB

Length of furnace 15 ft. 6 in.

Height of furnace from hearth to top of arch 2 ft. 6 in.

Side walls and doors 9 in. K-26 IFB

BABCOCK & WILCOX

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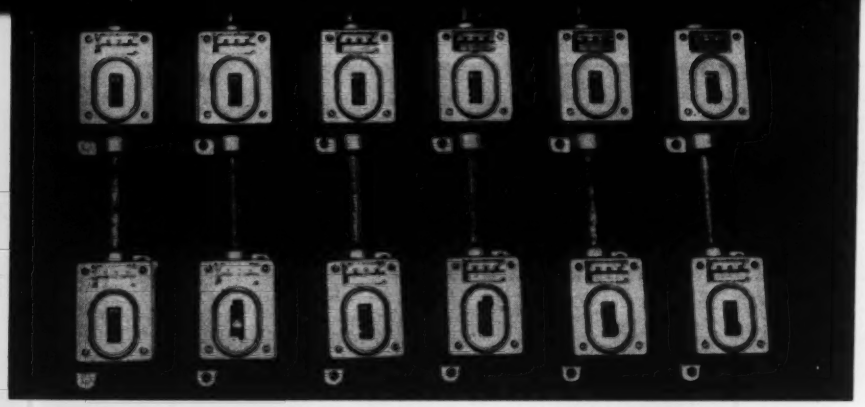

Fig. 3—Blowing engineer has at his command a set of two switches for each stack for amber light operation and announcing wind changes

tion at the Youngstown stacks.

The six blast furnaces at the Ohio Works are served by three blowing rooms. The present whistle signal system is inadequate in that there is no check as to whether the wind requirements are promptly taken care of and what the conditions are at each furnace.

Plus Public Address System — The new system will make for better furnace control and will be augmented by a public address system for special requests. This system will make it possible for each blowing room operator to know the blowing setup at all times on each furnace, i.e., full wind, check, or double check. It also will signify to the furnace operator a check as to whether wind change has been received and executed.

The blowing signal system consists of two panels in each furnace cast house and blow room, one for lights, the other for control switches. These panels are connected together by a 12-conductor control cable between cast house and blow rooms and a 52-conductor cable between blow rooms.

Fig. 4—Panel board in blowing engine room is equipped with blinker lights and horn

Blast furnace light panel boards, (Fig. 1) consist of seven lights: Three, amber colored, indicating the blowing room (Nos. 2, 3 or 4) blowing that furnace; one red blinker light to indicate that the wind change has been requested and made; and one blue, clear, and green light for required wind, full, check, and double check, respectively. At the cast house control station are the following switches, (Fig. 2) one 4-position switch for wind requirement, marked O, F, C, and D off, full wind, check, and double check, respectively; one pushbutton for horn control, and one blinker control switch.

The light panel in each blow room (Fig. 4) consists of five rows of six lights each; on the top are red blinker lights, and the next row consists of amber colored lights and indicates the furnace being blown from this particular location. The following three rows are blue, clear, and green lights, respectively. The control panel in the blow room (Fig. 3) is composed of two rows of six switches each. The top row controls the amber lights, both at the blow room and the furnace house. The bottom row shuts off red blinker at both locations, indicating the wind change is completed.

How It Works—Signals operate as follows: First the blowing room operator throws the amber light control switch for the furnace being blown from his location. If, however, as in most cases, each blow room blows more than one furnace, the operator selects the switches for the proper furnace, thus lighting up the amber light on the blow room panel under the chosen furnace numbers, and also lighting up the amber light on the panel of the furnaces selected opposite the correct blow room number. For example, No. 2 blowing room now blows Nos. 1, 2, and 4 blast furnaces so the amber light opposite No. 2 on the light panels at Nos. 1, 2, and 4 furnaces will light up, as well as the amber lights under the numbers 1, 2, and 4 on the blow room panel. The furnace operator is now free to call for the required amount of wind; he does this by first moving the wind selector switch to the station indicating the desired wind; this lights up the proper light on each of the light panels at all the blow rooms as well as the corresponding light on his furnace light panel. At the same time he also pushes the horn pushbutton and throws the red blinker light switch, thus sounding the horn and flashing his blinker light and the light in the designated blow room. The blowing room operator now changes the engines so that the correct wind is being blown, and then throws his blinker light switch notifying the furnace operator that the change has been made by turning off the red blinker lights, thus completing the signaling operation.

For Normal Operation—This signal system takes care of normal wind changes. The low-pressure alarm system is to be installed and will be one where the low-pressure switches are located on the blowing room side of the snort valve on the cold blast main. These switches will be set to close at a 5-pound blast pressure. The closing of a switch will actuate the audible alarm at the furnace as well as the blowing room; also, a light will show an emergency exists.

At the moment the alarm goes off in the blowing room the engineer knows he must first put steam into the cold blast line where the low pressure exists and then take necessary steps to get some wind in the line. The furnace foreman knows when the alarm indicates pressure under 5 pounds that he also must follow a definite procedure with the furnace until the wind is restored.

The high temperature alarm also to be installed will have thermostatic switches in the cold blast line adjacent to the snort valves on the blowing engine side. These alarms will actuate at temperatures in excess of normal blast line temperature to indicate the beginning of a cold blast main fire; steps then can be taken by both operating units to extinguish the fire before any serious damage can be done.

In addition to these alarm systems, there is a loud speaker system where any furnace foreman can talk to any blow-room engineer to discuss planned shutdowns or other emergency conditions which may arise.

Presented at annual winter meeting of Eastern States Blast Furnace and Coke Oven Association, William Penn Hotel, Pittsburgh, Feb. 24.

A NEW, MORE POWERFUL SIZE 504 AIR IMPACTOOL!

Rated for nut running up to ⅜" bolt size

- **20% increase in impacting torque** makes **easier** and **faster** work of the toughest nut running jobs.
- **65% increase in the free speed** of the new 504 Impactool cuts run-down time and lowers assembly costs.
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- **12% increase in gear life** is obtained by the use of larger, more rugged gearing.
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Surface Finish

(*Concluded from Page 79*)

differences in shape, size, material, or character of the two surfaces.

Plastic Replica Method of Surface Evaluation—Because of the widespread interest in and importance of surface finish, the National Bureau of Standards has investigated[6] the application of nearly transparent surface replicas for evaluation of metal surface finish. This study has resulted in the development of a method for evaluating the finish of a surface through the medium of a properly prepared replica of the surface. In the method, the replica is prepared by applying a suitable solvent to the metal surface, after which a clear plastic film is pressed on.[7] The solvent softens the side of the film adjacent to the metal surface being examined, and permits it to flow and conform under pressure to the minute surface irregularities.

Examination of replicas so produced showed that the degree of transparency decreased with increased roughness of the original surface. The rougher the metal surface, the more pronounced the variations in the geometry of the reduced patterns became. This led to the development of an apparatus for evaluating surface roughness based on the degree of variation of the geometric characteristics in a nearly transparent surface replica. This method consists essentially in passing a narrow beam of light transversely through the moving replica.

Variations in the geometric character of the film, which are associated with roughness of the reproduced metal surface, control the intensity of the light passing through the film and thereby reaching the photoelectric cell at any particular instant. Fluctuations of intensity of the transmitted light cause a pulsating voltage in the cell circuit which is recorded by an electronic voltmeter. Voltage thus increases with increased surface roughness.

Some of the salient features attributed to the replica method are: (1) Easy maintenance of a permanent record of a metal surface finish; (2) rapid average evaluation of a considerable length and width of the surface at one sitting; (3) simplicity of operation; (4) absence of the personal factor; (5) preservation of the surface, even for soft metals, such as lead or tin-base bearing metals; and (6) availability of the method, since the replica may be prepared in one location and transported to the location of the analyzer. In addition, it is reported in the Bureau of Standards work that the method is especially sensitive to small changes in surface roughness for the finer grades of metal finish.

Surface Reproduction with Three-Dimensional Effect—A recent report[8] based on work carried out at Washington University, St. Louis, has shown that if a reasonably flat metal surface is pressed into a fine-grained photographic emulsion at about 15,000 psi, and the plate developed, a pattern will be observed on microscopic examination that reproduces the surface contours. The method is said to reproduce the detailed structure of any kind of surface, whether machined, lapped or polished. Of particular interest is the pronounced three-dimensional appearance of the surface reproduction. This effect was described as being made evident by gradations in density across the negative.

The method which resulted from research projects being sponsored at St. Louis University by grants from the Office of Naval Research, uses equipment shown in Fig. 20. The specimen surface is prepared in the form of a thin disk of the same diameter as the flat face of ball A (¼-inch). The photographic plate P is placed emulsion side up between the prepared surface of specimen S and the flat surface of ball A. The mechanical arrangement is designed to insure proper seating of the specimen's surface on the emulsion. Ball A rotates fairly freely in the grease packed well W, allowing it to square the specimen against the emulsion. A hydraulic press is applied to plunger D, the pressure applied to a specimen being indicated by a gage.

The type of photographic emulsion to be used in this application is of importance. For pressure work of this kind it is necessary to use unprotected emulsions. The Ilford "nuclear research plates B2, C2, El and Dl" and Eastmen "nuclear track plates A, B, and C" appear to be sufficiently sensitive to pressure for this application.

Particular feature of the technique which makes it well suited for surface replicas is its fidelity in reproducing the third dimension of a contour. A gelatin emulsion, even in the dry state, is sufficiently plastic that under pressure it assumes the shape of the surface on which it is pressed. In particular, the greater the pressure at any point the greater the density at that point after development. Thus, high spots on a specimen surface cause greater than average density while indentions cause lesser density.

Three dimensional nature of the specimen surface is thereby made evident by gradations in density across the negative. The result is a high contrast, transparent replica of the specimen surface. In most work pressures of about 15,000 psi are generally applied for about 1 minute. After compression, the photographic plates are developed, fixed, washed and dried in the conventional manner.

For all references see Part I, STEEL, June 19, p. 116.

Marform Goes Abroad

MARFORM metal forming process developed by Glenn L. Martin Co., Baltimore, Md., will be introduced in Europe and other export territories by Loewy Engineering Co. Ltd., London, England. According to the recent announcement, complete presses as well as the equipment for incorporation into existing presses to carry out the Marform process will be supplied by the British company.

The announcement follows the designation of Hydropress Inc., New York, to manufacture and sell the units in the United States. The Martin Co. has stated that formed sheet metal parts may be produced at savings as high as 50 per cent and that the new method results in an increase in the production rate of numerous types of detailed parts and a considerable decrease in labor and tooling costs.

CALENDAR OF MEETINGS

† *Denotes first listing in this column*

June 26-30, American Society for Testing Materials: Annual meeting and exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J. Headquarters of society: 1916 Race St., Philadelphia 3.

June 26-July 21, Product Design Seminar: Lehigh University, Bethlehem, Pa. Sponsored by Lehigh and Society of Industrial Designers, 48 E. 49th St., New York 17.

July 12-14, American Society of Civil Engineers: Summer convention, Toronto, Ont. Society headquarters are at 33 W. 39th St., New York.

July 12-14, American Home Laundry Manufacturers' Association: Meeting, Atlantic City, N. J.

July 28, Malleable Founders' Society: Western sectional meeting, Drake Hotel, Chicago. Society headquarters are in the Union Commerce Bldg., Cleveland.

Aug. 7-19, First U. S.-International Trade Fair: Coliseum, International Amphitheater and Navy Pier, Chicago. Fair headquarters are in Congress Hotel, Chicago.

Aug. 14-16, Society of Automotive Engineers: West coast meeting, Biltmore Hotel, Los Angeles. Society headquarters: 29 W. 39th St., New York 18.

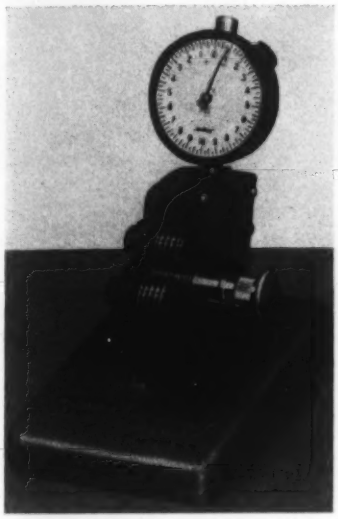
Aug. 16-18, Third Western Packaging and Materials Handling Exposition: Civic Auditorium, San Francisco. Additional information from Clapp & Poliak Inc., 341 Madison Ave., New York 17.

†**Sept. 5-9, American Chemical Society:** National Chemical Exposition, Chicago Coliseum. Sponsored by Chicago Section, ACS 86 E. Randolph St., Chicago 1.

New Products and Equipment

Speeds Thread Inspection

Operated with a minimum of skill and requiring no computations or auxiliary equipment is the Tri-Roll thread comparator for rapid and accurate checking of male threads, available from Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford 1, Conn. Externally



threaded parts to be measured are cradled between two stationary gaging rolls and a third roll, mounted on a preloaded armature. Dial indicator, graduated in increments of 0.00025-inch, gives cumulative readings of errors in lead, angle and pitch diameter.

Initial setting is established with a setting plug. Amount of deviation in oversize or undersize threaded parts is registered on the dial. Classes 1, 2, 3, 4 and 5 American national threads or 1A, 2A and 3A unified threads may be checked from the same initial setting. Within range of each gage, rolls can be changed for another diameter or pitch.

Sheet Buffing Machine

Hill Acme Co., Cleveland, O., is building a 48-inch wide openside oscillating sheet buffing machine, (right) with hydraulic table and power elevating and lowering head for 18-inch diameter buff roll or Tampico brush roll. For heavy-duty protection finishing of ferrous and nonferrous sheets, the machine's mechanism is powered by a 3 hp motor and has a stroke variation of ½ to 2 inches and a range of 50 to 150 cycles per minute.

The main spindle is powered by a 50 to 100 hp main drive motor. The machine is built in table widths up to 72 inches and table lengths of 8 feet or over.

Maintains Tension and Speed

Chronic problem of maintaining constant tension and lineal speed in wire winding operations is solved by a new drive developed by Twin Disc Clutch Co., Racine, Wis. Called the Hydro-Wynd, it combines a hydraulic coupling with a planetary gear set, whose ring gear is fixed to the impeller or pump of the hydraulic coupling. Planet gear carrier is fixed to the runner of the coupling, while the sun gear is fixed to the output shaft.

In operation, the automatic "slip" of the coupling reacts with the gear set against the varying torque and speed requirements of the winding spool. As the torque load increases or decreases, the drive increases or decreases output torque, rather than horsepower, directly in proportion to the load imposed. Where controlled tension is necessary despite day-to-day changes in materials, weights or speeds, a variable speed drive may be used with the new device.

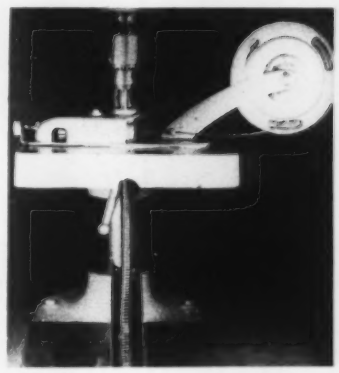
Oil Dispensing Unit

For servicing hydraulic machines with new oil, moving dirty oil from hydraulic supply tanks, providing machine tools with clean coolant and transferring quench oil to heat-treating machines, the Houdaille oil dispensing unit, made by Honan-Crane Corp., 636 Wabash Ave., Lebanon, Ind., is a handy tool. Unit is also adaptable to many other liquid handling problems.

Fully enclosed vacuum pump and ⅓-hp motor are operated by a single manual switch. A three-way valve permits change-over from vacuum to pressure side of pump as needed. No liquid or abrasives pass through the pump to cause wear or stoppage. An airtight lid for open-top drums is equipped with a Mercoid liquid level control to prevent overflow. Pivoted platform permits easy loading and unloading of 55-gallon oil drums.

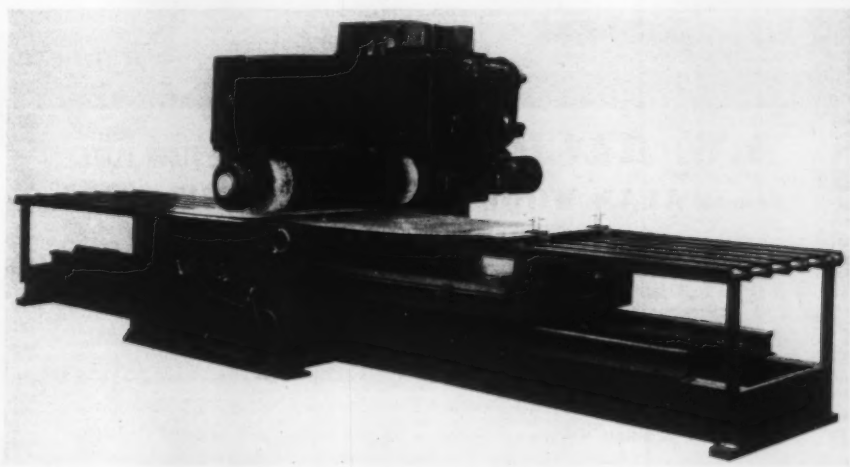
Drill Press Is Spring Maker

Springs of all sizes may be produced continuously at high speed on any ½-inch drill press by an attachment developed by Cycloid Corp., Saugus, Mass. Once in operation, no other attention is required other than replacement of wire spools and



starting. Capacities include wire from 6 to 28 gage. Innersprings can be made to vary from 3/16 to ⅝-inch OD. Special spindles are available for making springs of special dimensions.

Pitch of compression springs may be infinitely varied to suit application while machine is running. Length of springs is governed only by length of wire used. Three spindles are provided which have four steps each.



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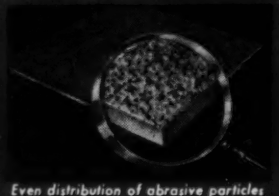

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Install A.W. ALGRIP for positive non-slip protection in all areas subjected to oil, grease or water on which men walk or climb . . . loading platforms, ramps, washroom floors, fire escapes, running boards and similar surfaces. A.W. ALGRIP prevents slipping even on steep inclines. And remember it's low in cost, easy to install, requires no maintenance, and is resistant to heat, fire and heavy traffic.

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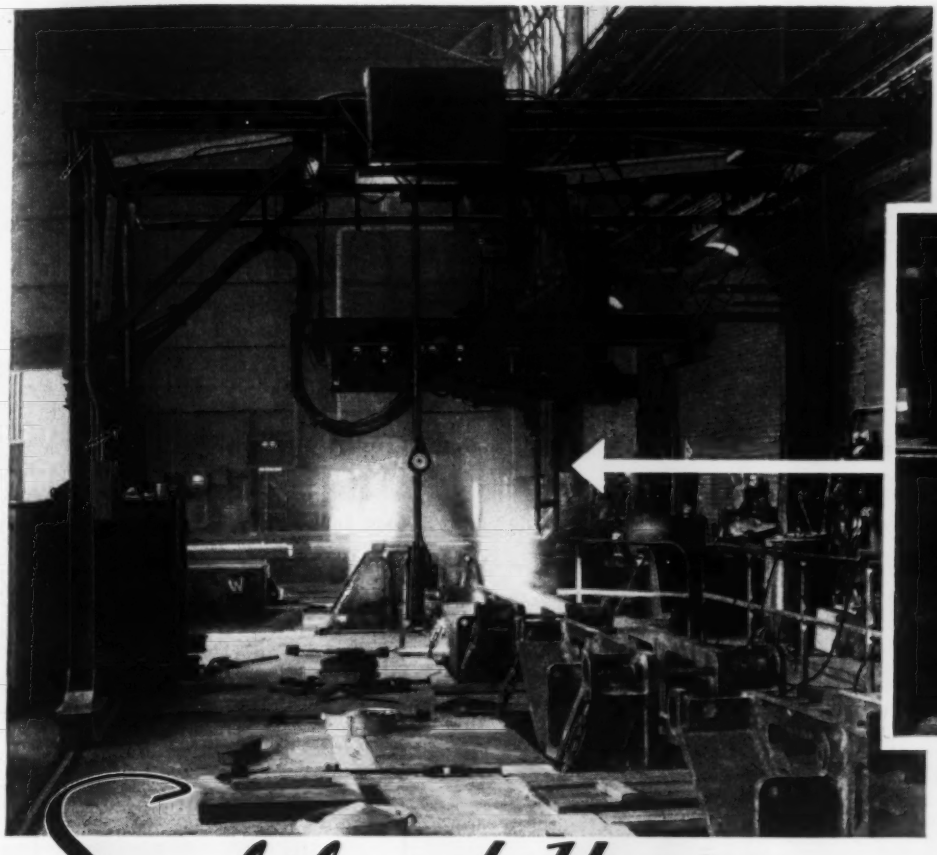
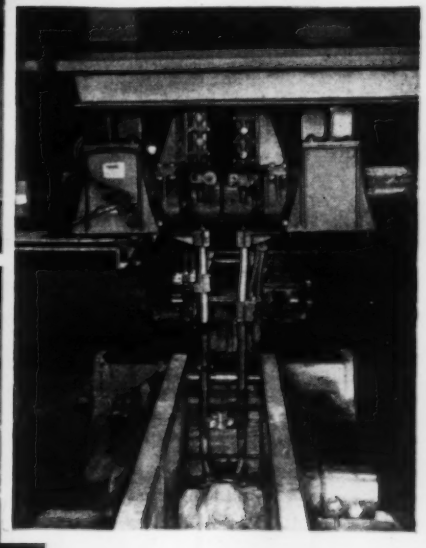


Left — This welding gantry in a prominent steel mill is the first application of the new Cleveland Tramrail stabilized hoist principle for welding purposes.

Below — The welding heads supported by the stabilized hoist, travel without sway or vibration and automatically apply a straight continuous and accurate welding bead.



Stabilized Hoist PROVIDES ~

VIBRATION-FREE TRAVEL FOR UNION MELT WELDING

The first application of a Cleveland Tramrail stabilized hoist for automatic welding by the Union Melt Process has proven completely successful. The stabilized hoist eliminates all vibration and pendulum motion at the welding heads, permitting the laying of straight, perfect welds.

The two welding heads are secured to the load bar of the hoist. The hoist in turn is supported by the Cleveland Tramrail gantry crane. The stabilized hoist which remains absolutely rigid in any position because of the unique triangular hoisting rope arrangement, can be adjusted to any height within 4'0" limits. Welds can be made of any length up to the length of the crane runway.

Welding speed may be varied from 4 to 80 inches per minute by changing the gantry travel speed by means of push buttons on the pendant control cable. A tachometer on the cable just above the buttons keeps the operator informed of the welding speed.

The gantry crane with stabilized hoist is lighter and easier to manipulate than the usual heavy structural type of welding travel equipment. It is simple to adjust, convenient to use and very flexible in application to different kinds of work.

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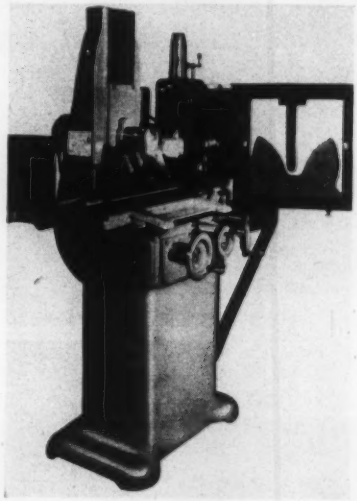
onds. Work to be pierced is clamped to the cross slide in proper relation to a template.

All template holes representing the same size punch can be connected by a colored paint line to form a visual chain for the operator to follow with the stylus. Press is automatically tripped, but only after the stylus point has positively engaged the template hole. Press will handle sheets up to 28 x 40 inches. Capacity is 15 tons pressure, with an $\frac{1}{16}$-inch ram stroke operating at 175 strokes per minute.

Contour Grinding Machine

Continuous inspection as grinding progresses and the elimination of many involved setups are advantages claimed for the Visual-Grind optical contour grinding machine manufactured by Cleveland Grinding Machine Co., 6514 St. Clair Ave., Cleveland 3, O. Three techniques in optical contour grinding are available in the same machine: Image, profile and templet. In image grinding, the light is condensed onto an oblique reflector which directs the beam to the left against the front of the workpiece. It is projected on a screen without inversion or reversal.

For profile projection an auxiliary mirror is placed behind the workpiece. Light carrying past the work and grinding wheel is reflected back



through an apperture and lenses to the ground glass screen. It appears as a sharp, dark image on the brightly illuminated screen. The templet technique combines the other two methods. Both templet and workpiece are projected on the screen simultaneously, making possible accurate grinding to the desired form by matching one image with the other. Four standard magnifications are available. Capacity, using a 7-inch wheel, is 6 x 8 x 16 inches.

Separates Tramp Iron

Available in three different magnetic strengths and a full range of sizes are Alnico plate magnets for separation of tramp iron from materials in process, made by Eriez Mfg. Co., Erie, Pa. Known as Atomagnets, the units have a formed cover enclosing the magnet castings.

Added structural strength is derived from riveted construction. Insulation of the plate's working surface confines magnetic strength to desired area. A flush air gap on the plate face prevents gathering of fine iron in this location.

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Proper thrust and correct action for practically any size drill working in any drillable material is provided by an automatic air power feed for small drill presses, developed by Beckett-Harcum Co., Wayne Rd., Wilmington, O. Featuring instant reversal of

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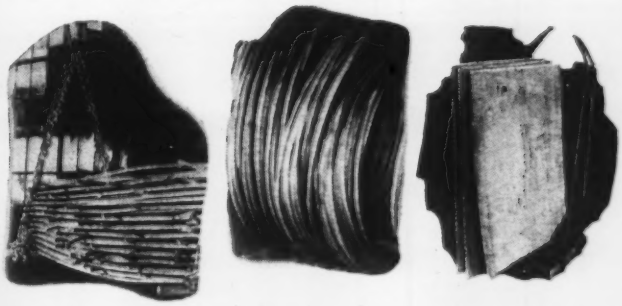

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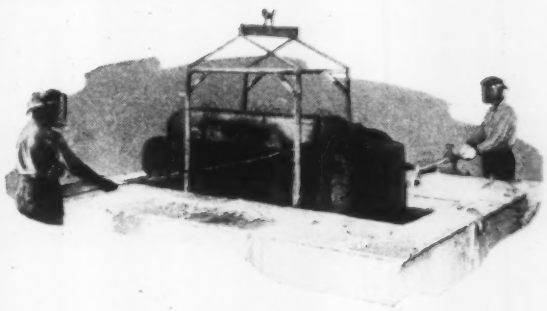

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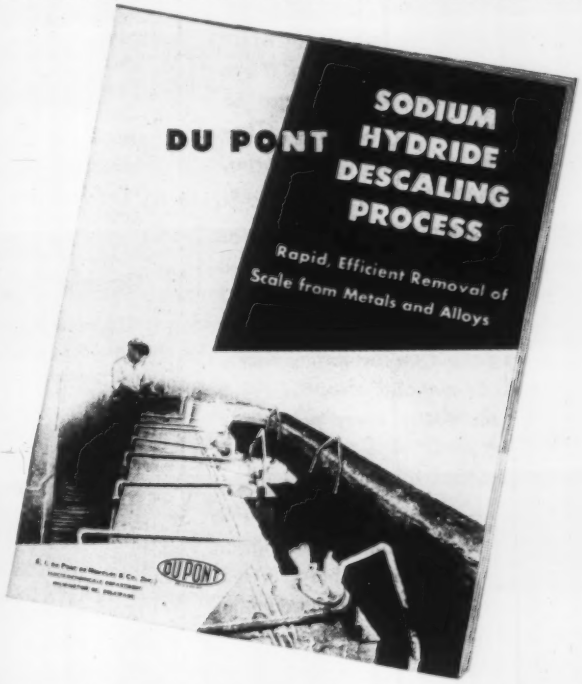

It gives the many advantages of the process. Shows how they help *you*. Tells exactly what Sodium Hydride Descaling is, how it works and where it is used, along with interesting photographs, diagrams and technical information, designed to help you get the most out of your scale removal jobs. Send for it today! Clip the coupon and mail it to E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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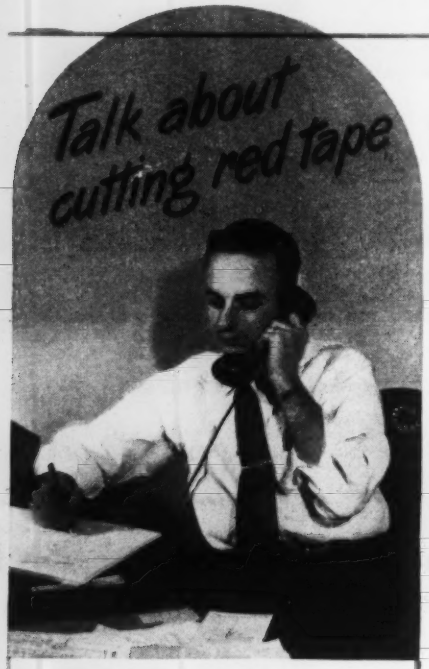
Firm _____

Address _____



"We certainly did that one recent Friday afternoon. One of our oil field customers had a fire which damaged part of the shop. It was about 1 p.m. when we got an emergency call for steel. They needed ***4673 Pounds of Plates, Beams and Channels*** *cut to size.*

"About 2 p.m. they called for an additional ton of angles and channels, also cut to size. All of this material had to be taken from storage, put on the cutting racks, marked, cut and shipped. At 4 that same day every piece was on the job."

This is the kind of emergency service that's routine at Levinson. You'll always get the material you order exactly as specified, delivered when you need it!

COMPLETE STOCK OF STEEL BEAMS, ANGLES, CHANNELS, PLATES, STRIP, AND ALUMINUM SHEETS, TUBING, ROUNDS, SQUARES, ETC.

L55-4

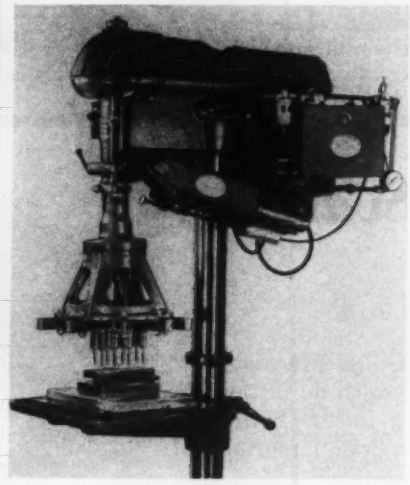
Levinson

STEEL SALES CO.

PITTSBURGH, PA.

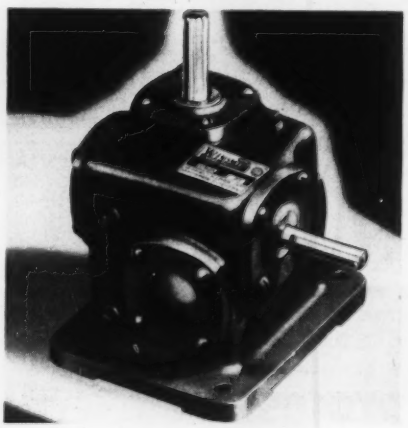
thrust on breakthrough and accuracy of 0.001-inch maintained on depth control, unit has an infinitely variable speed of stroke in either direction.

Air feed operates on low pressures and does not extend beyond face of the drill press. Operation is either by hand trip rod or momentary-contact foot switch. Either continuous or single cycle operation can be employed. Unit is offered in either standard or heavy duty models in four feed types: Drill; drill with dwell; drill, chip clean and dwell; and drill and tap. Models fit drill presses having 1¼-inch pinion shafts but are readily adapted to shafts of other sizes.



Double Reduction Speed Reducer

Available in 24 different right angle drive assemblies for fractional horsepower and small space requirements is the type DBRA double reduction speed reducer, manufactured by Winfield H. Smith Corp., Springville, N. Y. Totally enclosed in a single compact housing, reducers are available in a range of 1/20 to 1/8 hp and reduction ratios of 25:1 to 1764:1.

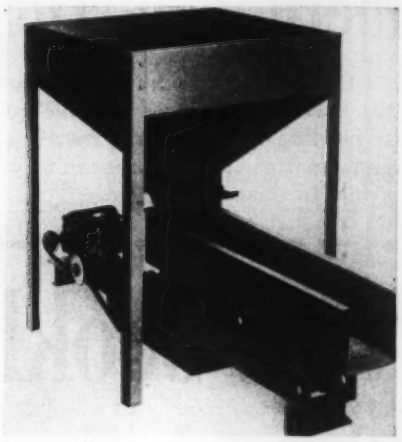


Designed to serve requirements necessitating 1500 pounds, the speed reducer unit has a long-lived worm gear design and Timken bearings.

Conveys Through Vibration

Metal turnings and trimmings, sand, coal and other materials, may be conveyed horizontally, around corners and up inclines by a vibrating feeder and conveyor, developed by Free-Flow Co., 1530 N. Gordon St., Hollywood 28, Calif. Assuring a uniform conveying speed regardless of load, the conveyor has low power consumption and is quiet in operation.

Troughs can be furnished in any suitable material and may be open or enclosed. Conveyor is made in sizes and capacities to suit the user's requirements. Use may be for hot or cold materials of any size or shape.



Power Mixer Is Portable

Patterson Foundry & Machine Co., East Liverpool, O., is offering the Typhoon mixer in both plain and direct drive types and geared type models in ¼, ½ and ¾-hp models. All are available with open and explosion-proof motors. Features include light construction, continuous-duty industrial type motor and widely-spaced outboard ball bearings.

Both direct drive and geared units have full universal adjustment, for use at any angle of operation. All mixers are supplied with stainless steel shafts and two stainless steel propellers.

Laboratory Blast Cabinet

Equipped with a loading drawer, a suction sand blast gun that will handle sand, aluminous oxide or the new soft grit abrasive is the laboratory type blast cabinet made by Ruemelin Mfg. Co., 3860 N. Palmer St., Mil-

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waukee 12, Wis. Standard equipment includes a vision screen, electric light, cloth type dust filter with exhaust fan and a ¼-hp single phase electric

motor. Stop and start of abrasive stream is by foot control valve. Cabinet measures 16 x 19 x 53 inches.

High Speed Electronic Drill

Employing an electronic principle of operation and using only one-fifth the usual power, the Electron drill, manufactured by Elox Corp., 740 N. Rochester Rd, Clawson, Mich., in-

creases the speed of cutting hardened steels as much as 15 times over previous models. Unit may be used for the production cutting of extremely small as well as large holes in hardened metals and for production removal of taps, drills and reamers in various sizes. On production drilling or salvage, performance may be duplicated exactly on each piece in regard to speed of cutting and type of hole required.

Drilling is a continuous process

"Automatic" AER-O-FOAM FOR INDUSTRY

Considered to be one of the foremost recent advancements in the science of fire protection, "Automatic" AER-O-FOAM has opened new avenues in fire safety which heretofore were not thought to be practical or economically feasible. Hazardous conditions familiar to chemical processing industries, metal working plants, petroleum storage and handling, electric power generation, and other occupancies where flammable liquids are involved, can now be fully safeguarded by engineered "Automatic" AER-O-FOAM protection.

A hydrolyzed protein, manufactured from a soya bean base, AER-O-FOAM when mixed with water and aerated, forms a smothering tenacious blanket capable of flowing around obstacles. The system is set into operation "Automatically" through the quick response of highly sensitive Rate-of-temperature-Rise heat detectors and allows for the speedy extinguishment of fires involving gasoline, benzol, naphtha, and many other flammable liquids.

This form of protection also provides important engineering advantages evidenced in the improvement of drainage conditions, reduction of water supply requirements, non-corrosive action of the foam material and prevention of re-flash. As "Automatic" AER-O-FOAM dehydrates rapidly following application, clean-up operations are practically non-existent.

Better investigate the advantages of "Automatic" AER-O-FOAM protection for those stubborn fire areas in your plant. More detailed information is available through your nearest "Automatic" Sprinkler representative. He'll be happy to furnish you with surveys and estimates without cost or obligation. Write or call today.

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

"Automatic" Sprinkler
FIRST IN FIRE PROTECTION
DEVELOPMENT . ENGINEERING MANUFACTURE . INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

for the full length of electrode used. Although the drill is entirely automatic, it can also be hand fed by operation of a switch and will chuck up to 36 inches of electrode. Having a 2 kva rating, the unit will operate from a 110 v 60-cycle lighting system. Typical time cycles for drilling are a ¼-inch hole in 25 seconds or a 1-inch hole in 140 seconds.

Supplies Clean, Dry Air

Oil and water are removed from high pressure air by an easily installed rectifier, made by Hymatic Engineering Co., Redditch, Worcestershire, England, for use with up to three average size industrial spray guns and combinations of guns and tools using up to 25 cu ft of air per minute. Unit also serves to reduce high pressure air on the inlet side to a constant value for delivery on the outlet side, irrespective of rate of demand. Air may be delivered without reduction by by-passing the reducing valve.

Air is introduced at high velocity through a specially designed orifice, mechanical separation being effected centrifugally by a downward rotating spiral motion. Second stage of purification is at reduced velocity through a scrubbing medium. Flush mounted pressure gage records pressure of outgoing air. Unit is made for various pressures and with varying numbers of outlets.

• • •

COMBINATION TOOL: Available in two types and a full range of sizes, the new Chip-Flow double-end combination drill and countersink announced by Cogsdill Twist Drill Co., Detroit, Mich., offers a new design in flute construction. Strength is assured because of balance between a fast spiral and a heavy flute construction.

CHARGES BATTERY: Model 669-6-1, a new single circuit charger for charging a 6-cell lead-acid battery of up to 300 amp-hr capacity, is offered by Motor Generator Corp., Troy, O. To start the automatic unit, operator inserts plug connection to battery and then moves time clock switch to the "stop" (charge position) which automatically energizes magnetic coil of the motor starting switch, starting the charge.

SHOP BOXES: New steel shop boxes, built in a wide range of standard sizes, types and combinations suitable for small parts handling requirements, are announced by Union Metal Mfg. Co., Canton 5, O. They incorporate innovations such as full length bottom runners, one-piece bottom and end construction, double reinforced corners.

QUICK MIXING: Leader Industrial Mixer Co., Chicago 41, Ill., offers a power mixer for heavy solutions. It is electrically driven, portable and requires no other installation than to plug into an electric outlet. Motor cover, shaft and blades are a unit and are removable without tools. Baffle on inside wall of pail breaks up particles in the mix and prevents over-surging at high rotor speeds.

PROTECTS METAL SURFACES: A new wax, introduced by S. C. Johnson & Son Inc., Racine, Wis., gives aluminum, steel, brass and other ferrous and nonferrous metals a dry coating that is resistant to salt spray, high humidity and hazards of outdoor exposure.

SLING CHAINS: Cleveland Chain & Mfg. Co., Cleveland 5, O., announces a more extensive line of Sterling wrought iron sling chains. It consists of a wide variety of single, double, 3-way and 4-way slings of virtually any desired length. Standard slings are made up of ⅜ to 1½-inch chain.

PROVIDES LUBRICATION: To provide automatic lubrication for tools using 10 to 60 cfm, Keller Tool Co., Grand Haven, Mich., has developed an air line lubricator in two sizes. A transparent Plexene bowl holding 6 ounces of light oil provides oil feed through a porous bronze wick. No regulation of oil flow is necessary.

TWIN CARTRIDGE RESPIRATOR: American Optical Co., Southbridge, Mass., offers R5055, a twin cartridge respirator that provides protection against low concentrations of organic vapors and all dusts.

TWO IN ONE: Plate Lok, made by Boots Aircraft Nut Corp., Stamford, Conn., is a self-locking nut employing the Hex-Lok principle. Essentially, it is two nuts in one. Top section is formed by depressing six threaded flanges inward and downward so they exert positive pressure against body of bolt without distorting or breaking bolt threads. Flanges are held by tension in this out of phase condition and returned to depressed position when bolt is removed.

CUSHION TIRE: Mono-Cushion, a new cushion tire for industrial trucks, is announced by Monarch Rubber Co., Hartville, O. It cuts maintenance costs on lift trucks and other industrial vehicles, contributes to easier steering, less load breakage and reduces floor wear.

RINSE GUN: Called the air and water rinser, a new gun offered by Turco Products Inc., Los Angeles 1, Calif., uses hot or cold water and connects to a regular air and water supply. The air and water systems are controlled separately of each other.

DETERMINES PERMEABILITY: Known as the Gordon-Campbell Permtester, a new instrument for determining permeability of sand molds and cores is announced by Claude S. Gordon Co., Chicago 16, Ill.

PROTECTS CONCRETE SURFACES: Hysol concrete floor enamels, a new material for protecting concrete surfaces from acids and other chemicals, has been developed by Houghton Laboratories, Olean, N. Y. Odorless and noncontaminating when dry, they are applicable by brushing methods. Nonoxidizing and fast drying, enamels provide a nonporous film that will not saponify.

REGULATES AIR: The new RFL unit, an air regulator-filter-lubricator, announced by Logansport Machine Co., Logansport, Ind., incorporates a piston-type reducing valve, pressure gage, lubricator and synthetic-type air filter element. It is installed in the air intake line from the main air line to regulate air pressure, filter and lubricate air.

HEX DRIVER: Magna Tool Corp., Buffalo 3, N. Y., offers a new magnetic driver for hex head screws and nuts. A permanent Alnico magnet, yieldingly recessed in the nut-driver socket, holds screw or nut firmly in position for starting and driving. Hex driver is available in all standard sizes from ¼ to ½-inch.

MEASURE VOLTAGE OUTPUTS: Portable and panel type electrostatic voltmeters are introduced by Cole Instrument Co., Los Angeles 15, Calif. They operated on the attraction or repulsion between two electrical surfaces and are used to measure high voltage outputs where no current can be drawn. Instruments are available in single ranges, full scale from 120 v to 12,000 v and multiranges from 120/240 to 1000/3000/7500 v.

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Market Summary

METALWORKING operations are hampered increasingly by the steel shortage. Some manufacturing schedules have been curtailed for lack of adequate supplies, chiefly the light, flat-rolled products. And more cutbacks threaten aside from regular vacation suspensions. Indications are supply conditions will worsen as summer advances and vacation finished steel production losses force additional shipment deferments and allotment cuts.

CUTBACKS—Steel consuming plants most severely hit so far by shortages are those that came into existence during and since the war. Lacking long established mill connections they have no dependable sources of supply and are forced to pick up tonnage wherever they can. But even consumers with mill connections are having supply trouble. For instance, the railroads complain they are not getting enough steel to support car repair and maintenance schedules.

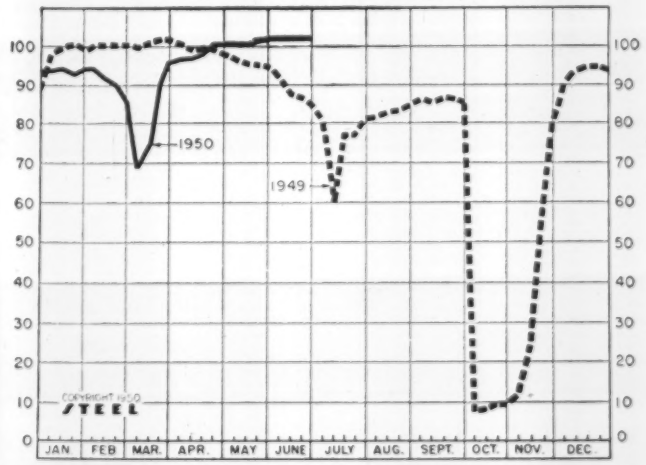
SUPPLY—There seems little chance for any appreciable improvement in supply conditions before fall at earliest. Mills will enter third quarter with unusually large order carryovers. Typical of the situation is the position of one leading producer. This maker will enter the new period with six weeks' arrearage in hot-rolled sheets, five to six weeks in carbon bars and two to three weeks in plates. That the carryover will absorb a considerable part of third quarter output of most major products is accepted in the trade as a virtual certainty. Of the leading products, sheets are tightest, followed by pipe, plates and bars. Structural deliveries are least extended but conditions in this area are gradually worsening. Shipments of some specialties, such as stainless products, are becoming increasingly extended. About the only important steel items in relatively easy supply appear to be tool steels, wire rope, heavy forgings, mechanical and boiler tubes, and some alloy specialties, particularly alloy bars.

PRODUCTION—High level steel ingot production into the fall is assured. At least one large producer is scheduling ingot output at 101 per cent of capacity into October. Other makers are expected to adopt similar policies. Finished steel output will be affected by shutdowns and curtailments not only for vacations but also for needed repairs. Last week steelmaking operations held at record pace, the estimated national ingot rate being unchanged for the fifth consecutive week at 101.5 per cent of capacity.

PRICES—Tone of the market is strong but no sign has yet appeared indicating a broad general price advance is contemplated. Rising production and raw material costs are being resisted by producers. However, advances on specific products continue to be made. Greer Steel Co. and John A. Roebling's Sons raised cold-rolled strip $7 per ton, and Rhode Island Steel Corp. $13. Several producers of galvanized pipe increased prices $6 and $8 per ton. These are Youngstown Sheet & Tube Co., Wheeling Steel Corp., National Supply Co., Pittsburgh Tube Co., Fretz-Moon Tube Co. and Republic Steel. Advances in galvanizing extras on wire products are under consideration.

COMPOSITES—Reflecting continued upward revisions by scattered producers, STEEL's arithmetical price composite on finished steel last week rose to $94.36 from $94.32. The weighted finished steel index, however, held steady at 156.58. Pig iron composites also were unchanged with No. 2 foundry, $46.47, basic, $45.97 and malleable, $42.27. Price composite on steelmaking scrap eased to $39.25 from $39.33 the week preceding. Scrap is in a definitely easier market with tonnage in freer supply from domestic sources and large imports beginning to arrive. No precipitous price reaction threatens.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended June 24	Change	Same Week 1949	Same Week 1948
Pittsburgh	101.5	0	81	93
Chicago	104.5	+ 2*	95.5	96
Eastern Pa.	98	0	80.5	90.5
Youngstown	106	0	88	103
Wheeling	102.5	— 4	66	96.5
Cleveland	98.5	— 3*	85	94.5
Buffalo	104	0	85	99
Birmingham	100	0	100	100
New England	92	+ 7	58	81
Cincinnati	106	+ 2	91	102
St. Louis	80	— 2	82	89.5
Detroit	111	+ 2	103	103
Western	96	+ 3*	82	..
Estimated national rate	101.5	0	84.5	96

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.
* Change from revised rate.

Composite Market Averages

	June 22 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.58	156.58	156.13	152.90	101.78
Index in cents per lb.	4.242	4.242	4.230	4.142	2.757
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$94.36	$94.32	$94.23	$91.82	$58.27
No. 2 Fdry. Pig Iron, GT	46.47	46.47	46.47	46.07	24.67
Basic Pig Iron, GT	45.97	45.97	45.97	45.60	24.00
Malleable Pig Iron, GT	47.27	47.27	47.27	47.27	25.29
Steelmaking Scrap, GT	39.25	39.33	35.50	20.17	19.17

* Revised.

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	June 22 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.45	3.45	3.45	3.35	2.25
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.25
Bars, C. F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95-4.00	2.65
Shapes, Std., Pittsburgh	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.25
Plates, Chicago	3.50	3.50	3.50	3.40	2.25
Plates, Coatesville, Pa.	3.60	3.60	3.60	3.50	2.25
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.40	2.25
Plates, Claymont, Del.	3.60	3.60	3.60	3.50	2.25
Sheets, H.R., Pittsburgh	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh	4.40	4.40	4.40	4.40	3.70
Strip, H.R., Pittsburgh	3.25	3.25	3.25	3.25	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–45	2.90
Wire, Basic, Pittsburgh	4.50	4.50	4.50	4.15	2.75
Nails, Wire, Pittsburgh	5.30	5.30	5.30	5.15	2.90
Tin plate, box, Pittsburgh	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts. (NT)	$63.00	$63.00	$63.00	$61.00	$42.00
Sheet bar, mill (NT)	58.00	58.00	58.00	67.00	36.00
Wire rods, 7/32-⅜", Pitts.	3.85	3.85	3.85	3.40	2.15

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	49.39	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila.	49.94	49.94	49.94	49.89	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	39.38	21.38
No. 2 Fdry. (Birm.)del.Cin.	49.08	49.08	49.08	45.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts.	$45.00	$45.00	$39.00	$23.00	$20.00
No. 1 Heavy Melt. E. Pa.	35.25	35.50	32.50	18.00	18.75
No. 1 Heavy Melt. Chicago	37.50	37.50	35.00	19.50	18.75
No. 1 Heavy Melt. Valley	42.50	43.75	38.75	22.00	20.00
No. 1 Heavy Melt. Cleve.	40.50	41.75	35.35	18.50	19.50
No. 1 Heavy Melt. Buffalo	39.75	39.75	34.50	19.75	19.25
Rails, Rerolling, Chicago	47.50	49.50	49.50	27.75	22.25
No. 1 Cast, Chicago	44.50	47.00	46.50	27.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$14.25	$14.25	$14.25	$13.50	$7.50
Beehive, Fdry., Connlsvl.	15.50	15.50	15.50	16.25	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	20.00	13.35

NONFERROUS METALS

Copper, del. Conn.	22.50	22.50	20.50	16.00	12.00
Zinc, E. St. Louis	15.00	15.00	12.50	9.00	8.25
Lead, St. Louis	11.80	11.80	11.80	11.85	6.35
Tin, New York	76.62½	77.50	78.50	103.00	52.00
Aluminum, del.	17.50	17.50	17.50	17.00	15.00
Antimony, Laredo, Tex.	24.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid	48.00	48.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark, del.	50.63	51.13	51.63	52.13
Brooklyn, N.Y., del.	....	52.79	53.29	....
Birmingham District				
Alabama City, Ala. R2	41.88	42.38	....	....
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward, Ala. W15	41.88	42.38	....	....
Cincinnati, del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda, N.Y., W12	46.00	46.50	47.00	....
N. Tonawanda, N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester, N.Y., del.	48.63	49.13	49.63	....
Syracuse, N.Y., del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	....	46.50	....
Indiana Harbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14, Y1	46.00	46.50	46.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	....	50.50	51.00	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
Los Angeles, San Francisco, del.	53.70	54.20	....	....
Granite City, Ill. M10	47.90	48.40	48.90	....
St. Louis, del. (incl. tax)	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
Neville Island, Pa. P6	46.00	46.50	46.50	47.00
Pitts. N.&S. sides, Ambridge, Aliquippa, del.	47.19	47.69	47.69	48.19
McKees Rocks, del.	46.95	47.45	47.45	47.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	47.44	47.94	47.94	48.44
Verona, del.	47.90	48.40	48.40	48.90
Brackenridge, del.	48.13	48.63	48.63	49.13
Bessemer, Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	....	....	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Swedeland, Pa. A3	48.00	48.50	49.00	49.50
Philadelphia, del.	49.44	49.94	50.44	50.94
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard, O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson, O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

Niagara Falls, N.Y. P15	$71.50
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton, Pa. B2	54.00
Philadelphia delivered	57.00
Troy, N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, June 22, 1950; cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 ... 51.00

BILLETS, BLOOMS & Slabs

Carbon, Rerolling (NT)
Bessemer,Pa. C3 ..... $53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 .. 58.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Cal. K1 ..... 72.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 ..... 53.00
Lackawanna,N.Y. B2.. 53.00
Munhall, Pa. C3 ..... 53.00
So.Chicago,Ill. C3 .... 53.00
So.Duquesne,Pa. C3 ... 53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 ..... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3 .65.00
Detroit R7 ..... 66.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 ..... 82.00
Gary,Ind. C3 ..... 63.00
Geneva,Utah G1 ..... 63.00
Houston,Tex. S5 ..... 71.00
Ind.Harbor,Ind. I-2 ... 63.00
Johnstown,Pa. B2 .... 63.00
Lackawanna,N.Y. B2.. 63.00
Los Angeles B3 ..... 82.00
Munhall,Pa. C3 ..... 63.00
Seattle B3 ..... 82.00
So.Chicago C3,R2,W14.63.00
So.Duquesne,Pa. C3 .. 63.00
So.SanFrancisco B3 ...82.00

Alloy (NT)
Bethlehem,Pa. B2 ....$66.00
Buffalo R2 ..... 66.00
Canton,O. R2, T7 .... 66.00
Conshohocken,Pa. A3.. 68.00
Detroit R7 ..... 66.00
Fontana,Calif. K1 .... 85.00
Gary,Ind. C3 ..... 66.00
Houston,Tex. S5 ..... 74.00
Ind.Harbor,Ind. Y1 ... 66.00
Johnstown,Pa. B2 .... 66.00
Lackawanna,N.Y. B2 .. 66.00
LosAngeles B3 ..... 86.00
Massillon,O. R2 ..... 66.00
Midland,Pa. C18 ..... 66.00
Munhall,Pa. C3 ..... 66.00
Sharon,Pa. S3 ..... 66.00
So.Chicago C3,R2,W14.66.00
So.Duquesne,Pa. C3 .. 66.00
Warren,O. C17 ..... 66.00
Youngstown Y1 ..... 66.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Gary,Ind. C3 ..... 76.00
Ind.Harbor,Ind. I-2 ... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00
So.Duquesne,Pa. C3 .. 76.00

SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.15
Warren,O. R2 ..... 3.15
Youngstown C3, R2 .... 3.15

WIRE RODS
AlabamaCity,Ala. R2 .. 3.85
Buffalo W12 ..... 3.85
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Houston,Tex. S5 ..... 4.25
Ind.Harbor,Ind. Y1 .... 3.85
Johnstown,Pa. B2 ..... 3.85
Joliet,Ill. A7 ..... 3.85
LosAngeles B3 ..... 4.65
Minnequa,Colo. C10 .... 4.10
Monessen,Pa. P7 ..... 3.85
No.Tonawanda,N.Y. B11 .3.85
Pittsburg,Calif. C11 .... 4.50
Portsmouth,O. P12 .... 3.85
Roebling,N.J. R5 ..... 3.95
So.Chicago,Ill. R2 ..... 3.85
SparrowsPoint,Md. B2.. 3.95
Sterling,Ill.(1) N15 .... 3.85
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 .... 4.65
Worcester A7 ..... 4.15

BEARING PILES
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

STRUCTURALS

Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.45
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston, Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 .... 3.40
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.00
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.00
Minnequa,Colo. C10 .... 3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 4.02
Phoenixville,Pa. P4 .... 3.30
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 4.05
So.Chicago,Ill. C3 W14.3.40
So.SanFrancisco B3 .... 3.95
Torrance,Calif. C11 .... 4.00
Weirton,W.Va. W6 ..... 3.40

Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2 .. 5.20
Clairton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 ..... 5.75
Gary,Ind. C3 ..... 5.15
Ind.Harbor,Ind. I-2, Y1.5.15
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y.(14)B2 5.20
LosAngeles B3 ..... 5.75
Munhall,Pa. C3 ..... 5.15
So.Chicago,Ill. C3 ..... 5.15
So.SanFrancisco B3 .... 5.70
Struthers,O. Y1 ..... 5.15

Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

H.S., L.A Wide Flange
Bethlehem,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 ... 5.20
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill. C3 ..... 5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 .... 4.20
Lackawanna,N.Y. B2 .. 4.20
Munhall,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 ..... 4.20
Weirton,W.Va. W6 .... 4.20

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 .. 3.50
Bessemer,Ala. T2 ..... 3.50
Clairton,Pa. C3 ..... 3.50
Claymont,Del. W16 .... 3.60
Cleveland J5, R2 ..... 3.50
Coatesville,Pa. L7 .... 3.60
Conshohocken,Pa. A3 .. 3.60
Ecorse,Mich. G5 ..... 3.75
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 ..... 3.85
Houston,Tex. S5 ..... 3.90
Ind.Harbor,Ind. I-2,Y1.3.50
Johnstown,Pa. B2 ..... 3.50
Lackawanna,N.Y. B2 .. 3.50
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.40
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. C3, W14.3.50
SparrowsPoint,Md. B2.. 3.50
Steubenville,O. W10 .... 3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 .... 3.50
Youngstown C3, R2 Y1.3.50

PLATES (Universal Mill)
Fontana,Calf. K1 ..... 4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 .... 5.25

FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 .. 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ... 3.75
Ashland,lcl(15) A10 .... 4.25
Cleveland,cl R2 ..... 4.10
Warren,O.cl R2 ..... 4.10

PLATES, Wrought Iron
Economy,Pa. B14 ..... 7.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.35
Bessemer,Ala. T2 ..... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 ..... 5.35
Conshohocken,Pa. A3 .. 5.35
Ecorse,Mich. G5 ..... 5.60
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 ..... 5.95
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1.5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 ..... 5.35
SparrowsPoint,Md. B2.. 5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35

PLATES, Open-Hearth Alloy
Claymont,Del. W16 .... 4.50
Coatesville,Pa. L7 .... 4.50
Conshohocken,Pa. A3 .. 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2 .. 4.40

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 .. 3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill.(1) L1 ..... 3.45
Ashland,Ky.(17) A10 .. 3.45
Atlanta,Ga A11 ..... 3.60
Bessemer,Ala T2 ..... 3.45
Buffalo R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.65
Emeryville,Calif. J7 .... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1.3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 3.85
Niles,Calif. P1 ..... 4.17
N.Tonawanda,N.Y. B11.3.45
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
Seattle B3, N14 ..... 4.20
So.Chicago C3, R2, W14.3.45
So.Duquesne,Pa. C3 .... 3.45
S.SanFran.,Cal. B3 .... 4.20
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Weirton,W.Va. W6 .... 3.45
Youngstown C3, R2 .... 3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta A11 ..... 3.60
Johnstown,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Niles,Calif. P1 ..... 4.17
Pittsburgh(23) J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SanFrancisco S7 ..... 4.00
Weirton,W.Va. W6 .... 3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2, T7 ..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.25
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.55
Lackawanna,N.Y. B2 .. 3.95
LosAngeles B3 ..... 5.00
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago C3, R2, W14.3.95
So.Duquesne,Pa. C3 .... 3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.95
Youngstown C3 ..... 3.95

BARS, Hot-Rolled Ingot Iron
Ashland,Ky.(17) A10 .. 3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Atlanta A11 ..... 5.35
Bessemer,Ala. T2 ..... 5.20
Bethlehem,Pa. B2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.40
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 ..... 6.25
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. I-2, Y1.5.20
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 .. 5.20
LosAngeles B3 ..... 5.90
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 .... 5.20
So.SanFrancisco B3 .... 5.95
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.15
Ambridge,Pa. W18 ..... 4.15
BeaverFalls,Pa. M12,R2.4.15
Buffalo B5 ..... 4.15
Camden,N.J. P13 ..... 4.63
Carnegie,Pa. C12 ..... 4.15
Chicago W18 ..... 4.15
Cleveland A7, C20 .... 4.15
Detroit P17 ..... 4.30
Donora,Pa. A7 ..... 4.15
Ecorse,Mich. G5 ..... 4.35
Elyria,O. W8 ..... 4.15
FranklinPark,Ill. N5 .... 4.15
Gary,Ind. R2 ..... 4.15
Hammond,Ind. L2, M13.4.15
Hartford,Conn. R2 ..... 4.55
Harvey,Ill. B5 ..... 4.15
LosAngeles R2 ..... 5.55
Mansfield,Mass. B5 .... 4.55
Massillon,O. R2, R8 .... 4.15
Midland,Pa. C18 ..... 4.15
Monaca,Pa. S17 ..... 4.15
Newark,N.J. W18 ..... 4.55
Plymouth,Mich. P5 .... 4.40
Pittsburgh J5 ..... 4.10
Putnam,Conn. W18 .... 4.55
Readville,Mass. C14 ... 4.55
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.15
SpringCity,Pa.(5) K3 .. 4.55
Struthers,O. Y1 ..... 4.15
Waukegan,Ill. A7 ..... 4.15
Youngstown F3, Y1 .... 4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 ..... 4.90
Ambridge,Pa. W18 .... 4.90
BeaverFalls,Pa. M12 .... 4.90
Bethlehem,Pa. B2 ..... 4.90
Buffalo B5 ..... 4.90
Canton,O. R2, T7 ..... 4.90
Carnegie,Pa. C12 ..... 4.90
Chicago W18 ..... 4.90
Cleveland A7, C20 ..... 4.90
Detroit P17 ..... 5.05
Donora,Pa. A7 ..... 4.90
Elyria,O. W8 ..... 4.90
Gary,Ind. R2 ..... 4.90
Hammond,Ind. L2, M13.4.90
Hartford,Conn. R2 ..... 5.20
Harvey,Ill. B5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.90
Mansfield,Mass. B5 .... 5.20
Massillon,O. R2, R8 .... 4.90
Midland,Pa. C18 ..... 4.90
Monaca,Pa. S17 ..... 4.90
Newark,N.J. W18 ..... 5.20
Plymouth,Mich. P5 ..... 5.10
So.Chicago,Ill. R2, W14.4.90
Struthers,O. Y1 ..... 4.90
Waukegan,Ill. A7 ..... 4.90
Warren,O. C17 ..... 4.90
Worcester,Mass A7 ..... 5.20
Youngstown F3, Y1 .... 4.90

RAIL STEEL BARS
ChicagoHts. (3) C2, I-2.3.30
ChicagoHts. (4) C2, I-2.3.45
Franklin,Pa. (3) F5 ... 3.45
Franklin,Pa. (4) F5 ... 3.45
FortWorth,Tex.(26) T4.4.33
Huntngtn,W.Va.(3) W7.3.45
Marion,O. (3) P11 ..... 3.45
Moline,Ill.(3) R2 ..... 3.40
SouthAvis,Pa.(2) J8 ... 3.30
SouthAvis,Pa.(41) J8 .. 3.30
SouthAvis,Pa.(42) J8 .. 3.30
Williamsport(2,3) S19 .. 3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14.8.60
Economy,Pa.(D.R.)B14 11.00
Economy,(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1..12.25
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ...4.35
LosAngeles B3 ..... 5.00
Marion,O. P11 ..... 4.40
Seattle B3, N14 ..... 5.10
SouthAvis,Pa. J8 ..... 4.35
So.SanFrancisco B3 .... 5.00
SparrowsPt., ¼-1" B2 ..4.35
Williamsport,Pa. S19 ..4.35

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.45
Alton,Ill.(6) L1 ..... 3.45
Atlanta A11 ..... 3.60
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2,Y1..3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 4.25
Niles,Calif. P1 ..... 4.17
Pittsburg,Calif. C11 ...4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SandSprings,Okla. S5 ..4.35
Seattle,Wash. B3, N14..4.20
SouthAvis,Pa. J8 ..... 3.45
So.Chicago,Ill. R2 ..... 3.45
So.Duquesne,Pa. C3 .... 3.45
So.SanFrancisco B3 ...4.20
SparrowsPoint,Md. B2..3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2 .... 3.45

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 ..... 3.35
Cleveland J5, R2 ..... 3.35
Conshohocken,Pa. A3 ..3.45
Detroit M1 ..... 4.15
Ecorse,Mich.(8) G5 ....3.55
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.25
Gary,Ind. C3 ..... 3.35
Ind.Harbor,Ind. I-2, Y1.3.35
Irvin,Pa. C3 ..... 3.35
Lackawanna,N.Y. B2 ..3.35
Munhall,Pa. C3 ..... 3.35
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. W14 ....3.35
SparrowsPoint,Md. B2 ..3.35
Steubenville,O. W10 .... 3.35
Torrance,Calif. C11 .... 4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 3.35
Youngstown C3, Y1 ....3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 ..... 4.65
Ind.Harbor,Ind. I-2 ....4.40
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.10
Torrance,Calif. C11 .... 5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.05
Conshohocken,Pa. A3 ..5.05
Ecorse,Mich. G5 ..... 5.25
Fairfield,Ala. T2 ..... 5.05
Fontana,Calif. K1 ..... 6.74
Gary,Ind. C3 ..... 5.05
Ind.Harbor,Ind. I-2, Y1.5.05
Irvin,Pa. C3 ..... 5.05
Lackawanna(35) B2 ...5.05
Pittsburgh J5 ..... 5.05
Sharon,Pa. S3 ..... 5.05
So.Chicago,Ill. C2 ..... 5.05
SparrowsPoint(36) B2 ..5.05
Warren,O. R2 ..... 5.05
Weirton,W.Va. W6 ....5.05
Youngstown, C3, Y1 ...5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.20
Ecorse,Mich. G5 ..... 6.40
Fontana,Calif. K1 ..... 7.05
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. I-2, Y1.6.20
Irvin,Pa. C3 ..... 6.20
Lackawanna(37) B2 ...6.20
Pittsburgh J5 ..... 6.20
SparrowsPoint(38) B2..6.20
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 ....6.20
Youngstown Y1 ..... 6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va. F4	5.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Gal'vd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.15
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.45
Gary,Ind. C3	6.35
Irvin,Pa. C3	6.35
SparrowsPoint,Md. B2	6.45
Yorkville,O. W10	6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

BLUED STOCK, 29 Ga.

Yorkville,O. W10	6.00

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt, B2	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, WROUGHT IRON

	An'ld	Galv.
Apollo,Pa. B14	12.00	15.50

SHEETS, Well Casing

Torrance,Calif. C11	4.85

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance, Calif. C11	4.05

SHEETS, Aluminized

Butler,Pa. A10	7.75

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton, W. Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Parkersburg F4 (cut lengths)	...	...	...	...	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths)	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2.	7.40	7.60
Gary C3	7.30	7.50
Ind.Harbor I-2, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10.	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Atlanta(9) A11	5.10
Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	5.70
Sharon,Pa. S3	4.95
So.SanFrancisco(25) B3	5.70
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.50
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.50
Conshohocken,Pa. A3	3.35
Detroit M1	4.05
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.50
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.50
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.50
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.85	8.80	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.50	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	*4.50*
Berea,O. C6	5.00
Bridgprt,Conn.(10) S15	4.50
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.75
Detroit D2	4.75
Detroit M1	4.95
Dover,O.(40) G6	*4.50*
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.50
Fontana,Calif. K1	4.40
FranklinPark,Ill. T6	4.30
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.50
Mattapan,Mass.(21) T6	4.65
Middletown,O. A10	4.15
NewBritain(10) S15	4.50
NewCastle,Pa. B4	4.30
NewCastle,Pa.(40) E5	4.15
NewHaven,Conn. D2	5.00
NewHaven,Conn. A7	4.65
NewYork W3	5.00
Pawtucket,R.I. R3	*5.15*
Pawtucket,R.I.(21) N8	5.00
Riverdale,Ill. A1	4.30
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.00
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	*5.00*
Wallingford,Conn. W2	5.00
Warren,O.(40) T5	*4.50*
Warren,O. R2	4.15
Weirton,W.Va. W6	4.15
Youngstown C8, Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y., B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W.Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.	C11 Columbia Steel Co.
A3 Alan Wood Steel Co.	C12 Columbia Steel &Shaft.
A4 Allegheny Ludlum Steel	C13 Columbia Tool Steel Co.
A7 American Steel & Wire	C14 Compressed Steel Shaft
A8 Anchor Drawn Steel Co.	C16 Continental Steel Corp.
A9 Angell Nail & Chaplet	C17 Copperweld Steel Co.
A10 Armco Steel Corp.	C18 Crucible Steel Co.
A11 Atlantic Steel Co.	C19 Cumberland Steel Co.
A13 American Cladmetals Co.	C20 Cuyahoga Steel & Wire
B1 Babcock & Wilcox Tube	D2 Detroit Steel Corp.
B2 Bethlehem Steel Co.	D3 Detroit Tube & Steel
B3 Beth. Pac. Coast Steel	D4 Disston & Son,Henry
B4 Blair Strip Steel Co.	D6 Driver-Harris Co.
B5 Bliss & Laughlin Inc.	D7 Dickson Weatherproof Nail Co.
B6 Bolardi Steel Corp.	E1 Eastern Gas&Fuel Assoc.
B8 Braeburn Alloy Steel	E2 Eastern Stainless Steel
B11 Buffalo Bolt Co.	E4 Electro Metallurgical Co.
B14 A. M. Byers Co.	E5 Elliott Bros. Steel Co.
C1 Calif. Cold Rolled Steel	E6 Empire Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.	F2 Firth Sterling Steel
C3 Carnegie-Illinois Steel	F3 Fitzsimons Steel Co.
C4 Carpenter Steel Co.	F4 Follansbee Steel Corp.
C5 Central Iron & Steel Div. Barium Steel Corp.	F5 Franklin Steel Div., Borg-Warner Corp.
C7 Cleve.Cold.Roll.MillsCo.	F6 Fretz-Moon Tube Co.
C8 Cold Metal Products Co.	G1 Geneva Steel Co.
C9 Colonial Steel Co.	G2 Globe Iron Co.
C10 Colorado Fuel & Iron	G3 Globe Steel Tubes Co.
	G4 Granite City Steel Co.
	G5 Great Lakes Steel Corp
	G6 Greer Steel Co.
	H1 Hanna Furnace Corp.
	H4 Heppenstall Co.
	I-1 Igoe Bros. Inc.
	I-2 Inland Steel Co.
	I-3 Interlake Iron Corp.
	I-4 Ingersoll Steel Div., Borg-Warner Corp.
	J1 Jackson Iron & Steel Co.
	J3 Jessop Steel Co.
	J4 Johnson Steel & Wire Co.
	J5 Jones & Laughlin Steel
	J6 Joslyn Mfg. & Supply
	J7 Judson Steel Corp.
	J8 Jersey Shore Steel Co.
	K1 Kaiser Steel Corp.
	K2 Keokuk Electro-Metals
	K3 Keystone Drawn Steel
	K4 Keystone Steel & Wire
	K5 Kidd Drawn Steel Co.
	L1 Laclede Steel Co.
	L2 LaSalle Steel Co.
	L3 Latrobe Electric Steel
	L5 Lockhart Iron & Steel
	L6 Lone Star Steel Co.
	L7 Lukens Steel Co.

UNIVERSITY OF MICHIGAN LIBRARIES

TIGHT COOPERAGE HOOP

Atlanta A11 .....3.40
Riverdale,Ill. A1 .....3.40
Sharon,Pa. S3 .....3.65
Youngstown C3 .....3.40

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....5.90
Alton,Ill.(1) L1 .....5.90
Bartonville,Ill.(1) K4 ..5.90
Buffalo W12 .....5.90
Cleveland A7 .....5.90
Donora,Pa. A7 .....5.90
Duluth A7 .....5.90
Fostoria,O. S1 .....5.90
Johnstown,Pa. B2 .....5.90
LosAngeles B3 .....6.85
Millbury,Mass(12) N6 ..6.20
Monessen,Pa. P7, P16 .5.90
Palmer,Mass. W12 .....6.20
Pittsburg,Calif. C11 ...6.85
Portsmouth,O. P12 .....5.90
Roebling,N.J. R5 .....6.20
So.Chicago,Ill. R2 .....5.90
SparrowsPoint,Md. B2 .6.00
Struthers,O. Y1 .....5.90
Trenton,N.J. A7 .....6.20
Waukegan,Ill. A7 .....5.90
Williamsport,Pa. B2 .....6.00
Worcester A7,J4,T6,W12.6.20
Worcester,Mass. N6 ...6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 .....5.35
Buffalo W12 .....5.35
Cleveland A7 .....5.35
Crawfordsville,Ind. MS..5.35
Dover,O. G6 .....5.35
Fostoria,O. S1 .....5.50
Kokomo,Ind. C16 .....5.35
FranklinPark,Ill. T6 ...5.70
Massillon,O. R8 .....5.35
Monessen,Pa. P7, P16..5.35
Pawtucket,R.I.(12) N8 6.00
Trenton,N.J. R5 .....5.65
Worcester A7, T6, W12..5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4 ..8.45
Buffalo W12 .....8.45
Chicago W13 .....8.45
Cleveland A7 .....8.45
Crawfordsville,Ind. MS..8.45
Fostoria,O. S1 .....8.45
Johnstown,Pa. B2 .....8.45
Kokomo,Ind. C16 .....8.45
Monessen,Pa. P16 .....8.45
Palmer,Mass. W12 .....8.75
Portsmouth,O. P12 .....8.45
Roebling,N.J. R5 .....8.75
Waukegan,Ill. A7 .....8.45
Worcester,Mass. A7, T6.8.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4 ..10.55
Monessen,Pa. P16 .... 10.80
Roebling,N.J. R5 .....10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2 ..4.50
Aliquippa,Pa. J5 .....4.50
Atlanta A11 .....4.60
Alton,Ill.(1) L1 .....4.50
Bartonville,Ill.(1) K4 ..4.50
Buffalo W12 .....4.50
Chicago W13 .....4.50
Cleveland A7, C20 .....4.50
Crawfordsville,Ind. MS..4.60
Donora,Pa. A7 .....4.50
Duluth A7 .....4.50
Fairfield,Ala. T2 .....4.50
Fostoria,O.(24) S1 .....4.85
Houston S5 .....4.90
Johnstown,Pa. B2 .....4.50
Joliet,Ill. A7 .....4.50
KansasCity,Mo. S5 .....5.10
Kokomo,Ind. C16 .....4.60
LosAngeles B3 .....5.45
Minnequa,Colo. C10 .....4.75
Monessen,Pa. P7 .....4.50
Newark, 6-8ga. I-1 .....5.15
No.Tonawanda B11 .....4.50
Palmer,Mass. W12 .....4.80
Pittsburg,Calif. C11 ....5.45
Portsmouth,O. P12 .....4.50
Rankin,Pa. A7 .....4.50
So.Chicago,Ill. R2 .....4.50
SoSanFrancisco C10 ....5.45
SparrowsPoint,Md. B2 ..4.60
Sterling,Ill.(1) N15 .....4.50
Struthers,O. Y1 .....4.50
Torrance,Calif. C11 ....5.45
Waukegan,Ill. A7 .....4.50
Worcester,Mass. A7, T6.4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....5.55
Alton,Ill.(1) L1 .....5.55
Buffalo W12 .....5.55
Cleveland A7 .....5.55
Donora,Pa. A7 .....5.55
Duluth A7 .....5.55
Johnstown,Pa. B2 .....5.55
LosAngeles B3 .....6.50
Monessen,Pa. P7, P16..5.55
NewHaven,Conn. A7 ....5.85
Palmer,Mass. W12 .....5.85
Pittsburg,Calif. C11 ....6.50
Portsmouth,O. P12 .....5.55
Roebling,N.J. R5 .....5.85
So.Chicago,Ill. R2 .....5.55
SparrowsPoint,Md. B2 ..5.65
Struthers,O. Y1 .....5.55
Torrance,Calif. C11 ....6.50
Trenton,N.J. A7 .....5.85
Waukegan,Ill. A7 .....5.55
Worcester,Mass. A7 ....5.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....8.15
Monessen,Pa. P16 .....8.15
Roebling,N.J. R5 .....8.45
SparrowsPoint,Md. B2 ..8.25

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.35	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. MS	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy.Mo S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. MS	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	10.05	11.80
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Bartonville,Ill. K4	126
Crawfordsville MS	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill(1) N15	126

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	116
Duluth A7	116
Franklin,Pa. F5	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Marion,O. P11	*116*
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	120

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18Ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. MS	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116
Sterling,Ill. N15	116

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville MS	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
Portsmouth,O.(18) P12	113
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

NAILS & STAPLES, Stock To Dealers & Mfrs. (7) Col.

AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	*111*
Crawfordsville,Ind. MS	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	3.75

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. MS	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling,W.Va. W10	6.75

AXLES

Fairfield,Ala. T2	5.25
Gary,Ind. C3	5.25
Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25
McKeesRocks,Pa. C3	5.25

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N. Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Pittsburgh R2	4.20
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2	9.10
KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	8.85
Pittsburgh O3, P14	9.10
Seattle B3	9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2	5.60
Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron&Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango FurnaceCo.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo.	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, S8, T7, U4, V2, V3.

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.75c. 0.035" and heavier.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	5.5	9.0	7.5
¼	6.0	0.42	33.5	31.5	32.5	5.5	11.0	8.5
⅜	6.0	0.57	29.0	27.0	28.0	0.5	8.0	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.0	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30.0	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa, P9; Sharon, Pa. M6; Butler, Pa. ¼-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2 quotes 3 points lower on ½-in., through 3 in.; Monaca, Pa. P9 quotes 4 points lower on ½-in. through 3 in.; Sharon, Pa. M6, quotes 4 points lower; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., W10 quotes 3½ points lower on ⅛", 2½ pts on ¼-in., and 3 points lower on other listed sizes; Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 23.5% on 3½" and 4", and 3 points lower on listed sizes; R2; Youngstown, Y1, quotes 3 points lower; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown, Y1 quotes 3 points lower.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....
310	32.50	36.50	....	....	....	105.00
316	27.00	31.00	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....
318	29.50	33.50	....	....	....	....
321	23.50	27.50	....	23.00	25.00	90.00
347	25.00	29.00	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....
410	18.25	24.25	....	....	....	....
430	18.25	24.25	....	....	....	....
Nickel	27.50	34.50	31.50 41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	115.00
Monel	29.00	37.00	26.50 33.50	....	....	83.00
Copper*	....	....	20.35† 24.95‡	....	....	....

* Deoxidized. † 16.85c for hot-rolled. ‡ 21.70c for hot-rolled. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville L7; nickel, inconel, monel-clad plates, Coatesville L7; nickel, monel, copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam.. 27
- ⅝-in. & ⅝-in. 29
- ¾-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter 30
- over 6 in. long 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:
- ½-in. and smaller 25
- ⅝-in. & ⅝-in. 23
- ¾-in.-1½-in. 23
- 1⅝ in. and larger 16

H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⅝-in. & ⅝-in..	28	25
¾-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16

C.P. Hex.:		
½-in. & smaller	33	29
⅝-in. & ⅝-in..	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

½-in. and smaller	Hvy.	Reg.	Lght.
	35	41	41
⅝-in. & ⅝-in.	30	36	36
¾-in.-1½ in..	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in. .. 50
- ¾-in. through 1 in. .. 43

Longer than 6 in.:
- ¼-in. through ⅝-in.... 33
- ¾-in. through 1 in.... 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 41
¼-in. diam. & larger 24
N.F. thread, all diams. . 18

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.25c
⅞-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Type 301 through 347 sheet, except 309 E2.
Baltimore, bars wire and structurals A10.
Brackenridge,Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler,Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c, S18.
Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk,N.Y. bars, wire A4.
Duquesne, Pa., bars C3.
Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Harrison, N. J., Types 302, 304, 316 wire and strip D6.
Massillon, al. products, except Type 309 bars, wire & structurals quoted 42.00c. Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.
So. Chicago, Ill., bars & structurals C3.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 25.00
Tuluol, one deg...18.25-25.75
Industrial xylol ..19.75-27.50

Per ton bulk, ovens

Sulphate of ammonia.$32-45

Cents per pound, ovens

Phenol, 40 (carlots, returnable drums) 13.50
Do., less than carlots..14.25
Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-40.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge Iron:	
98+% Fe, carlots..	15.00
Swedish, c.i.f. New York, in bags....7.40-8.50	
Electrolytic Iron:	
Annealed, 99.5% Fe	30.50
Unannealed 99+% Fe	33.50
Unannealed 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..70.00-135.00	
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots..27.25-29.25	
Copper:	
Electrolytic 28.75-31.50	
Reduced	29.00
Lead	18.50
Manganese:	
Minus 100-mesh 52.00-55.00	
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel unannealed ..	66.00
Nickel-Silver, 10-ton lots	36.25
Silicon 34.00-40.00	
Solder (plus cost of metal)	8.50
Stainless Steel, 302...	75.00
Tin	90.50
Zinc, 10-ton lots..18.00-25.50	
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8%, minus 65 mesh, freight allowed, 1000 lb and over..	2.90
less than 1000 lb. .	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb..	2.75
82-88%, freight allowed, 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll,fur. ..$14.00-14.50
Connellsvll,fdry. ..15.00-16.00
New River, foundry...19.00
Wise county, foundry..15.95
Wise county, furnace..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.00
Everett, Mass., ovens
- New England, del.‡ 23.40

Chicago, ovens 21.00
- Chicago del. .....‡22.45
- Detroit, del. 24.91

Terre Haute, ovens....21.20
Milwaukee, ovens 21.75
Indianapolis, ovens 20.75
- Chicago, del. 24.12
- Cincinnati, del. 23.67
- Detroit, del. 24.65

Ironton, O., ovens. 20.40
- Cincinnati, del. 22.71

Painesville, O., ovens .21.90
- Buffalo, del. 24.02
- Cleveland, del. 23.62
- Erie, del. 22.04

Birmingham, ovens 19.15
- Birmingham, del. ...20.20

Philadelphia, ovens ...21.25
Neville Island,Pa.,ovens 21.00
Swedeland, Pa. ovens 21.20
Portsmouth, O., ovens.20.15
- Cincinnati, del. 22.71

Detroit, ovens 21.65
- Detroit, del. 22.65
- Buffalo, del 24.00
- Flint, del. 24.09
- Pontiac, del. 23.04
- Saginaw, del. 24.40

Includes representative switching charge of *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or witnin $4.15 freight zone from works.

UNIVERSITY OF MICHIGAN LIBRARIES

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.75	6.84	7.40	6.04	...	5.95	6.64	8.60	5.85	6.10	7.54
New York(c'try)	5.55	6.64	7.20	5.84	...	5.75	6.44	8.40	5.65	5.90	7.34
Boston (city) ..	5.95	6.75	7.37	5.90	...	5.80	6.39	8.70	5.95	6.28	7.48
Boston (c'try) .	5.75	6.55	7.17	5.70	...	5.60	6.19	8.50	5.75	6.08	7.28
Phila. (city) ..	6.45	6.60	7.10	5.99	...	5.85	6.46	8.40	5.70	5.90	7.00
Phila. (c'try)..	6.20	6.35	6.85	5.65	...	5.60	6.21	8.15	5.45	5.65	6.75
Balt. (city) ...	5.35	6.59	6.66	5.79	...	5.79	6.39	...	5.89	5.60	7.24
Balt. (c'try) ..	5.15	6.39	6.46	5.59	...	5.59	6.19	...	5.69	5.40	7.04
Norfolk, Va. ..	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Richmond, Va..	5.35	...	6.90	5.63	...	5.53	6.30	...	5.63	5.45	7.13
Wash. (w'hse).	5.56	6.80	6.73	6.00	...	6.00	6.62	...	6.10	5.81	7.45
Buffalo (del.)..	5.35	6.15	7.10	5.61	...	5.35	5.95	10.10††§	5.55	5.85	7.15
Buffalo (w'hse).	5.15	5.95	6.90	5.41	...	5.15	5.75	9.90††§	5.35	5.65	6.95
Pitts.(w'hse) ..	5.15	5.95*	6.60-6.70	5.20	6.15	5.10	5.75	9.55††	5.25	5.35	6.60
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	5.91	9.86††§	5.64	5.79	6.88
Cleveland (del.)	5.35	6.15	7.30	5.44	6.35	5.32	5.95	8.31	5.57	5.72	6.92
Cleve. (w'hse) .	5.15	5.95	7.10	5.24	6.15	5.12	5.75	8.16	5.37	5.52	6.72
Cincin. (city)..	5.57	6.14	6.54	5.50	...	5.50	6.11	...	5.79	5.94	7.10
Chicago (city) .	5.35	6.15	7.05	5.30	...	5.30	5.85	9.75††§	5.45	5.60	6.80
Chicago (w'hse)	5.15	5.95	6.85	5.10	...	5.10	5.65	9.55††§	5.25	5.40	6.60
Milwaukee(city)	5.49	6.29	6.94	5.44	...	5.44	6.09	9.89††§	5.59	5.74	6.94
Milwau. (c'try).	5.29	6.09	7.14	5.24	...	5.24	5.89	9.69††§	5.39	5.54	6.74
St. Louis (del.).	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††§	5.78	5.93	7.13
St. L. (w'hse).	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††§	5.58	5.73	6.93
Kans. City(city)	5.95	6.75	7.60	5.90	...	5.90	6.55	...	6.05	6.20	7.60
KansCity(w'hse)	5.75	6.55	7.40	5.70	...	5.70	6.35	...	5.85	6.00	7.40
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.30	6.10	6.30[2]	5.25	...	5.25	6.88	...	5.40	5.55	7.83
Birm'hm(w'hse)	5.15	5.95	6.15[2]	5.10	...	5.10	...	...	5.25	5.40	...
Los Ang. (city)	6.10	7.65	7.80	6.15	8.55	6.10	7.75	...	6.10	6.20	8.40
L. A. (w'hse)..	5.90	7.45	7.60	5.95	8.35	5.90	7.55	...	5.90	6.00	8.20
San Francisco .	6.25[9]	7.60[3]	7.50[3]	6.75[9]	8.25[3]	6.15[9]	7.55	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [9]—400 to 9999 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lot, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices. 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page 126*)

Copper Use at Three-Year High

Supplies remain extremely tight with bulk of production through July earmarked for customer account. Smelter receipts of scrap continue light

New York—Advance of ½-cent in custom smelters' offering price for copper scrap is bringing out only moderately heavier shipments of grades suitable for making refined copper. Some scrap dealers are holding their supplies on the prospects that the 2-cents a pound copper import duty will become effective June 30 when the present law suspending the import tax expires. If Congress does not act, the price for copper will be higher next month.

Refined copper supplies are being allocated due to the extremely tight supply situation. Bulk of production through July is earmarked for customer account. Copper consumption in May was the largest for any month in more than three years and the second highest for any month in the postwar period. New business booked by makers of copper products last month set a new record since the war's end. At the same time, supplies of copper held by fabricators are sharply lower.

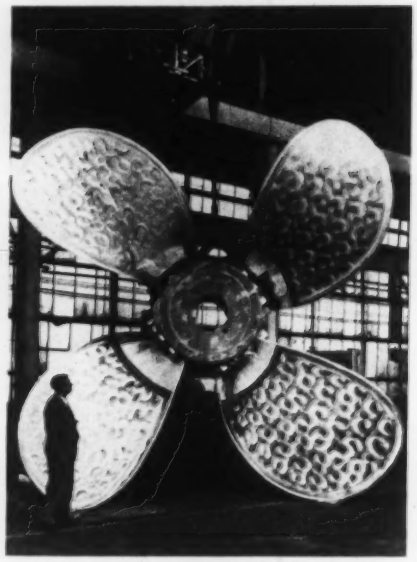
Product Shipments Heavy—Products shipped from brass mills, wire mills and foundries during May contained 133,365 tons of new refined copper. In only one other month in the postwar period have shipments from manufacturing plants contained more copper; that was in January, 1947, when 139,318 tons were used. The May total was 9333 tons more than April shipments which accounted for 124,032 tons of the metal.

Reflecting the current extraordinary demand for copper, customers of copper product manufacturers placed orders last month in record postwar volume. New business booked in May for current and future shipment called for use of 154,295 tons of the metal for use in copper and brass sheet and strip, brass rods, copper rods, bronze and other alloys and copper wire and cable. This was the largest total for new orders placed for any month since the end of the war and exceeded new business booked in April of 119,936 tons by 34,359 tons.

With copper supplies scarce, plants manufacturing copper and copper-alloy goods were forced to sharply cut into their stocks on hand. Producers and custom smelters were able to ship only 113,415 tons of refined domestic and foreign copper to manufacturers' plants in May, a tonnage far short of the amount consumed. As a result, makers of copper products had to dig into their inventories to the tune of 19,739 tons, reducing supplies held at their plants to 338,504 tons at the end of May, the lowest since November, 1949, when stock-on-hand aggregated 328,551 tons. In April, inventories were reduced by 22,864 tons.

Unfilled orders on hand at the end of May amounted to 217,329 tons, an increase of 20,930 tons over the 196,399 tons at the end of April.

Total copper requirements of copper goods manufacturers at the end of May were placed at 500,750 tons, including 283,421 tons for working stocks and 217,329 tons for unfilled orders. To meet these needs, makers of copper products had 338,504 tons on hand and 89,514 tons on order, or a total of 428,018 tons. This left an apparent deficit of 72,732 tons. At the end of April, the apparent deficit had been 20,613 tons.



TANKER PROP: This built-up ship propeller is 22 feet in diameter and has a finished weight of almost 71,500 pounds. Its four separate manganese bronze propeller blades are bolted to a central hub of cast iron. The blades are highly polished and their mottled appearance is caused by light reflections from the patterns made by the polishing tool. Baldwin Locomotive Works, the builder, thinks it is the largest so far built in the U.S. It is for a tanker under construction by New York Shipbuilding Corp.

Zinc Price Tone Strong

New York—Demand for zinc is in excess of domestic smelter production plus normal imports of about 150,000 tons of slab zinc yearly, said Howard I. Young, president, American Zinc, Lead & Smelting Co., St. Louis. It appears that consumption this year will be at least 900,000 tons of zinc.

Stocks of slab zinc, which were only about 41,000 tons at the end of May, were at the lowest point in the history of the industry except for one wartime period. Mr. Young expected that a further reduction in stocks would occur during June.

Mr. Young, who also is chairman of the Nonferrous Metal Advisory Committee, said that the government wants to stockpile substantial amounts of zinc in the fiscal year ending June 30, 1951. Industry members of the committee have asked the United States stockpile authorities to cut their indicated requirements for this period in half.

These government requirements, plus increasing demands for zinc for galvanizing and die casting, account for the recent upward price movement. Undertone of the market is strong on the basis of 15.00c, E. St. Louis, for prime western. American Smelting & Refining Co.'s Rosita mine in Mexico is still strikebound.

Lead Demand Improves

New York—Some improvement in lead demand is noted, although it is spotty. Inquiry received by some sellers exceeds their daily intakes, while others report light sales. Supplies are ample to cover present requirements.

Prices are steady at 11.80c, St. Louis.

Shipments of lead and lead-base alloy die castings amounted to 3,101,000 pounds in the first four months of the year compared with 2,490,000 pounds shipped in the like 1949 period, reports the Bureau of the Census.

Tin Drops Below 77-Cent Level

New York—Straits tin for prompt delivery was available last week at prices below the 77-cent level for the first time since May 8. Compared with prevailing prices in London and Singapore, the market here is low. Offerings generally were in excess of demands.

Information available to the government defense agencies makes it imperative from a security standpoint that the Texas City, Tex., tin smelter remain under government operation for a five-year period, representatives of these agencies testified at a hearing before the Senate Armed Services Subcommittee. Wiley F. McKinnon, chief, Tin Division, Reconstruction Finance Corp., said the government should operate the smelter until stockpile requirements are satisfied, after which private industry could take over the plant.

To Improve Aluminum Mill

Spokane, Wash. — Kaiser Aluminum-Chemical Co. plans early improvement at the Trentwood aluminum rolling mill, which in June will produce as much as in July and August, 1949. New equipment is being ordered for the hot rolling line which will be modernized. No improvements at the Mead plant are planned until additional electric power is available.

Reduces Contract Rates

Seattle—Pacific Coast-River Plate Steamship Conference, effective May 23, reduced contract rates on copper bars to $18 per short ton, from $26; copper scrap, packed, to $20, weight or measurement, from $29; lead bars, ingots and pigs to $18 from $25. Copper billet rate is fixed at $18 per short ton.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 22.50c, Conn. Valley; Lake 22.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 21.75-22.00c; 88-10-2 (No. 215) 29.00c; 80-10-10 (No. 305) 25.50c; No. 1 yellow (No. 405) 18.25-19.00c.

Zinc: Prime western 15.00c; brass special 15.25c; intermediate 15.50c, East St. Louis; high grade 16.10c, delivered.

Lead: Common 11.80c; chemical 11.90c; corroding 11.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.50c, pigs 16.50c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 18.25-18.75c; No. 12 foundry alloy (No. 2 grade) 17.75-18.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.75c; grade 2, 18.00c; grade 3, 17.25c; grade 4, 16.75c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 21.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt and July del. 76.62½c; Aug., Sept. del. 76.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese and Yugoslavian, 22.00c; English and Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 48.00c; 25-lb pigs, 50.50c; "XX" nickel shot, 51.50c; "F" nickel shot or ingots, for addition to cast iron, 48.50c. Prices include import duty.

Mercury: Open market, spot, New York $70-$73 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2.15 del.; special or patented shapes, $2.30.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 72.75c per oz.

Platinum: $66-69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 22.50-cent copper.)

Sheet: Copper 37.43; yellow brass 34.19; commercial bronze, 95%, 37.38; 90%, 36.93; red brass, 85% 35.96; 80%, 35.52; best quality, 35.04; nickel silver, 18%, 48.39; phosphor-bronze, grade A, 5% 55.11.

Rods: Copper, hot-rolled 33.28; cold-drawn 34.53; yellow brass free cutting, 28.54; commercial bronze, 95% 37.07; 90% 36.62; red brass 85% 35.65; 80% 35.21.

Seamless Tubing: Copper 37.47; yellow brass 37.20; commercial bronze 90% 39.59; red brass 85% 38.87; 80% 38.43.

Wire: Yellow brass 34.48; commercial bronze, 95% 37.67; 90% 37.22; red brass, 85% 36.25; 80% 35.81; best quality brass 35.33.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 26.67, l.c.l. 27.17, 100,000 lb lots 26.545; weatherproof, f.o.b. eastern mills, c.l. 28.10, l.c.l. 28.60, 100,000 lb lots 27.85; magnet, del., 15,000 lb or more 32.50, l.c.l. 33.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.)

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	27.4	...	...
0.135-0.096	12-48	27.9	...	...
0.095-0.077	12-48	28.4	26.5	30.1
0.076-0.061	12-48	29.0	26.7	30.3
0.060-0.048	12-48	29.2	26.9	30.6
0.047-0.038	12-48	29.6	27.1	30.9
0.037-0.030	12-48	30.0	27.5	31.4
0.029-0.024	12-48	30.4	27.8	31.8
0.023-0.019	12-36	31.0	28.2	32.3
0.018-0.017	12-36	31.6	28.8	33.1
0.016-0.015	12-36	32.3	29.4	34.0
0.014	12-24	33.2	30.2	35.1
0.013-0.012	12-24	34.1	30.9	36.0
0.011	12-24	35.1	31.8	37.2
0.010-0.0095	12-24	36.1	32.8	38.5
0.009-0.0085	12-24	37.3	33.9	40.0
0.008-0.0075	12-24	38.6	35.1	41.6
0.007	12-18	40.0	36.4	43.4
0.006	12-18	41.5	37.7	47.5

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	48.5	....	....
0.156-0.203	41.5	....	....
0.219-0.313	38.5	....	....
0.344	37.5	....	47.5
0.375	37.0	46.0	44.5
0.406	37.0	....	....
0.438	37.0	46.0	44.5
0.469	37.0	....	....
0.500	37.0	46.0	44.5
0.531	37.0	....	....
0.563	37.0	....	42.0
0.594	37.0	....	....
0.625	37.0	43.5	42.0
0.656	37.0	....	....
0.688	37.0	....	42.0
0.750-1.000	36.0	41.0	39.5
1.063	36.0	....	38.0
1.125-1.500	35.0	39.5	38.0
1.563	35.0	....	37.0
1.625	34.0	....	37.0
1.688-2.000	34.0	....	....
2.125-2.500	33.0	....	....
2.625-3.375	32.0	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List prices plus 45%.

ZINC

Sheets, 20.75c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 20.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 19.00c; over 12-in., 20.00c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 69.00c. Strip, cold-rolled, 75.00c. Rods and shapes, 65.00c. Plates, 67.00c. Seamless tubes, 98.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 53.00c. Strip, cold-rolled, 56.00c. Rods and shapes, 51.00c. Plates, 52.00c. Seamless tubes, 86.00c. Shot and blocks, 46.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-57.50c; 25 to 99 lb, 45.00-47.50c; 100 lb to 5000 lb, 37.50-38.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 34.09c; oval 33.59c; cast 32.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 51.40c, under 1000 lb 49.40c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 28.00c; over 200 lb, 27.00c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 65.00c; 10,000 to 30,000 lb, 63.00c; 3000 to 10,000 lb, 67.00c; 500 to 3000 lb, 68.00c; 100 to 500 lb, 70.00c; under 100 lb, 73.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 29.50c; 400-lb bbl, 27.50c up to 10,000 lb, 27.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 93.00c, 500 to 999 lb, 93.5c; 200 to 499 lb, 94.00c; less than 200 lb, 95.5c, ball, 1000 lb and over, 95.25c; 500 to 999 lb, 95.75c; 200 to 499 lb 96.25c; less than 200 lb, 97.75c, f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 59.2c; 100 or 300 lb drums only, 100 to 500 lb, 50.9c; 600 to 1900 lb, 48.5c; 2000 to 9900 lb, 46.8c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 44.6c, 10 or more drums 42.6c, f.o.b. Niagara Falls, N. Y.; 45.85c and 43.85c, respectively, del. Cleveland or Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Heavy Clean	Ends Rod	Turnings Clean
Copper	19.50	19.50	18.75
Yellow Brass	16.75	16.50	15.50
Commercial Bronze			
95%	18.50	18.25	17.75
90%	18.375	18.125	17.625
Red brass			
85%	18.125	17.875	17.375
80%	17.875	17.625	17.125
Best Quality (71-80%)	17.50	17.25	....
Muntz metal	15.75	15.50	15.00
Nickel, silver, 10%	19.12½	18.87½	9.56¼
Phos. bronze, A	19.75	19.50	18.50
Naval brass	16.12½	15.87½	15.37½
Manganese bronze	16.12½	15.87½	15.25

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 19.50; No. 2 copper 18.50; light copper 17.50; composition red brass 16.50; radiators 13.50; heavy yellow brass 12.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 19.50; No. 2 copper 18.50; light copper 17.50; refinery brass (60% copper) per dry copper content 17.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 17.50-18.00; No. 2 16.50-16.75; light copper 15.50-15.75; No. 1 composition red brass 14.75-15.00; No. 1 composition turnings 14.25-14.50; mixed brass turnings 9.25-9.50; new brass clippings 15.00-15.25; No. 1 brass rod turnings 13.25-13.50; light brass 9.25-9.50; heavy yellow brass 10.00-10.25; new brass rod ends 13.50-13.75; auto radiators, unsweated 11.50-11.75; cocks and faucets, 13.00-13.25; brass pipe 13.25-13.50.

Lead: Heavy 9.50-9.75; battery plates 5.25-5.50; linotype and stereotype 11.50-11.75; electrotype 9.75-10.00; mixed babbitt 9.75-10.00.

Zinc: Old zinc 8.00-8.25; new die cast scrap 8.25-8.50; old die cast scrap 5.50-5.75.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 11.50-12.00; old sheets 8.50-9.00; crankcase 8.50-9.00; borings and turnings 5.50.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
June 22	22.50	11.80	15.00	76.625	17.50	24.50	48.00	72.75
June 21	22.50	11.80	15.00	76.875	17.50	24.50	48.00	72.75
June 20	22.50	11.80	15.00	76.75	17.50	24.50	48.00	72.75
June 19	22.50	11.80	15.00	77.00	17.50	24.50	48.00	72.75
June 15-17	22.50	11.80	15.00	77.25	17.50	24.50	48.00	72.75
June 14	22.50	11.80	15.00	78.00	17.50	24.50	48.00	72.75
June 13	22.50	11.80	15.00	77.625	17.50	24.50	48.00	72.75
June 12	22.50	11.80	15.00	77.75	17.50	24.50	48.00	72.75
June 9-10	22.50	11.80	14.50	78.25	17.50	24.50	48.00	72.75
June 7-8	22.50	11.80	14.50	78.375	17.50	24.50	48.00	72.75
June 6	22.50	11.80	14.50	78.00	17.50	24.50	48.00	52.75
June 5	20.50-22.50	11.80	14.50	78.00	17.50	24.50	48.00	72.75
June 2-3	20.50	11.80	14.50	78.125	17.50	24.50	48.00	72.75
June 1	20.50	11.80	13.00	77.875	17.50	24.50	48.00	72.75
May Avg.	19.962	11.521	11.990	77.500	17.192	24.50	40.308	72.635

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, June 22, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

June 22	$39.25
June 15	39.33
May 1950	33.82
June 1949	20.85
June 1945	19.07

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$45.00§*
No. 2 Heavy Melt.	*39.00§*
No. 1 Busheling	45.00
No. 1 Bundles	*46.00-48.00§*
No. 2 Bundles	*45.00-36.00§*
Heavy Turnings	36.00-37.00
Machine Shop Turnings	30.00-31.00†
Mixed Borings, Turnings	30.00-31.00†
Short Shovel Turnings	33.50-34.50
Cast Iron Borings	29.50-30.50
Low Phos. Steel	46.50-47.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-38.00
No. 1 Machinery Cast	41.00-42.00
Charging Box Cast	37.00-38.00
Heavy Breakable Cast	33.50-34.50

Railroad Scrap*

No. 1 R.R. Heavy Melt.	47.00
Rails, Random Lengths	45.00-46.00
Rails, 2 ft. and under	46.50-47.00
Rails, 18 in. and under	47.50-48.50
Railroad Specialties	50.00-51.00
Axles	45.00-46.00
Angles, Splice Bars	46.00-47.00

* Nominal.
† Crushers' buying prices.
§ Brokers paying $41 - $42 for heavy melting and correspondingly lower prices for other open-hearth grades.

CLEVELAND

No. 1 Heavy Melt. Steel	*$40.50**
No. 2 Heavy Melt. Steel	*35.50**
No. 1 Busheling	*40.50**
No. 1 Bundles	*40.50**
No. 2 Bundles	*30.50**
Machine Shop Turnings	26.00-27.00
Mixed Borings, Turnings	28.50-29.50
Short Shovel Turnings	28.50-29.50
Cast Iron Borings	28.50-29.50
Low Phos.	42.50-43.00

Cast Iron Grades

No. 1 Cupola	*46.00-47.00*
Charging Box Cast	*42.00-43.00*
Stove Plate	*41.00-42.00*
Heavy Breakable Cast	*39.00-40.00*
Unstripped Motor Blocks	*32.00-34.00*
Brake Shoes	*34.00-35.00*
Clean Auto Cast	*46.00-47.00*
No. 1 Wheels	*42.00-43.00*
Burnt Cast	*36.00-37.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*46.00**
R.R. Malleable	49.00-50.00
Rails, 3 ft and under	*49.00-50.00*
Rails, 18 in. and under	*50.00-51.00*
Rails, Random Lengths	*48.00-49.00*
Cast Steel	*41.50-42.00*
Railroad Specialties	*42.50-43.00*
Uncut Tires	49.00-50.00
Angles, Splice Bars	*50.00-50.50*

* Nominal.

VALLEY

No. 1 Heavy Melt. Steel	*$42.50**
No. 2 Heavy Melt. Steel	*37.50**
No. 1 Bundles	*42.50**
No. 2 Bundles	*32.50**
Machine Shop Turnings	28.00-28.50
Short Shovel Turnings	30.50-31.00
Cast Iron Borings	30.50-31.00
Low Phos.	44.50-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*46.00**

* Nominal.

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$35.00-35.50**
No. 2 Heavy Melt. Steel	*32.00-32.50**
No. 1 Busheling	*34.00-34.50**
No. 1 Bundles	*35.00-35.50**
No. 2 Bundles	*28.00-28.50**
Machine Shop Turnings	24.00-25.00
Short Shovel Turnings	25.00-26.00
Mixed Borings, Turnings	23.00-24.00
Low Phos. Punchings and Plate, elec. fur. grade	40.00-41.00
Low Phos. Plate, 5 ft & Under	40.00-41.00
Elec. Furnace Bundles	*36.50**
Heavy Turnings	37.00-38.00*
No. 1 Chemical Borings	*34.00*
Knuckles and couplers	43.00-44.00*
Steel car wheels	43.00-44.00*

Cast Iron Grades

No. 1 Cupola Cast	*36.00*
No. 1 Machinery Cast	39.00-40.00
No. 1 Yard Cast	34.00-35.00
Charging Box Cast	36.00-37.00
Heavy Breakable Cast	36.00-37.00
Unstripped Motor Blocks	29.00
Clean Auto Cast	39.00-40.00
No. 1 Wheels	41.00-42.00
Malleable	45.00-46.00

*Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$38.00
No. 2 Heavy Melt. Steel	33.00
No. 1 Busheling	38.00
No. 1 Bundles	38.00
No. 2 Black Bundles	32.00
No. 3 Bundles	27.00
Machine Shop Turnings	21.00
Short Shovel Turnings	24.00
Mixed Borings, Turnings	23.00
Cast Iron Borings	24.00

Cast Iron Grades

No. 1 Cupola Cast	*47.00*
Charging Box Cast	38.00
Stove Plate	33.00
Heavy Breakable Cast	*37.00*
Unstripped Motor Blocks	29.00
Brake Shoes	*26.00*
Clean Auto Cast	*47.00*
Drop Broken Cast	*49.00*
Low Phos., 18 in. and under	*47.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00
R.R. Malleable	44.00
Rails, Rerolling	*44.00*
Rails, Random Lengths	*41.00*
Rails, 18 in. and under	*50.00*

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$27.00-28.00
No. 1 Bundles	39.00-40.00
No. 2 Bundles	26.50-27.00
No. 1 Busheling	38.50-39.00
Machine Shop Turnings	23.50-24.00
Forge Flashings	38.50-39.00
Short Shovel Turnings	25.50-26.00
Cast Iron Borings	25.50-26.00
Punchings & Plate Scrap	38.00-39.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-41.00
Heavy Breakable Cast	35.00-36.00
Clean Auto Cast	44.00-45.00

BUFFALO

No. 1 Heavy Melt. Steel	$39.50-40.00
No. 2 Heavy Melt. Steel	36.50-37.00
No. 1 Busheling	36.50-37.00
No. 1 Bundles	37.50-38.00
No. 2 Bundles	34.50-35.00
Machine Shop Turnings	30.50-31.00
Mixed Borings, Turnings	30.50-31.00
Cast Iron Borings	30.50-31.00
Short Shovelings	32.50-33.00
Low Phos.	42.50-43.00

Cast Iron Grades

No. 1 Cupola	*35.50-36.00*
No. 1 Machinery	*38.50-39.00*
Malleable	*32.50-33.00*

Railroad Scrap

Rails, 2 ft. and under	*46.50-47.00*
Rails, random size	*40.50-41.00*

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$31.00*
No. 2 Heavy Melt. Steel	26.00-27.00
No. 1 Busheling	*30.00*
No. 1 Bundles	32.00
No. 2 Bundles	*24.50-25.50*
Machine Shop Turnings	*18.50-19.00*
Mixed Borings, Turnings	20.00
Short Shovel Turnings	*20.50-21.00*
Punchings & Plate Scrap	32.00
Low Phos. Plate, 5 ft & under	32.00
Elec. Furnace Bundles	32.00

Cast Iron Grades

No. 1 Cupola Cast	29.00-29.50
No. 1 Machinery	30.00-31.00
Charging Box Cast	28.50-29.50
Heavy Breakable	28.50-29.50
Unstripped Motor Blocks	*22.00-22.50*

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$28.50-29.00*
No. 2 Heavy Melt. Steel	*23.50-24.50*
No. 1 Bundles	*28.50-29.50*
No. 1 Busheling	*25.50-26.00*
Machine Shop Turnings	*18.50-19.00*
Mixed Borings, Turnings	*18.50-19.00*
Short Shovel Turnings	*20.00-21.00*
Bar Crops and Plate	*30.50-31.50*
Punchings & Plate Scrap	*30.50-31.50*
Chemical Borings	*21.00-21.50*

Cast Iron Grades

No. 1 Cupola Cast	*30.00-31.00*
Mixed Cast	*28.00-29.00*
Heavy Breakable Cast	*31.00-32.00*
Stove Plate	*26.50-27.00*

CHICAGO

No. 1 Heavy Melt. Steel	$37.00-38.00*
No. 2 Heavy Melt. Steel	35.00-36.00*
No. 1 Bundles	35.00-36.00*
No. 2 Bundles	32.00-33.00*
Machine Shop Turnings	23.50-24.50
Mixed Borings, Turnings	23.50-24.50
Short Shovel Turnings	*24.00-25.00*
Cast Iron Borings	24.00-25.00
Low Phos.	*39.00-40.00*
Elec. Furnace Bundles	37.00-38.00
Heavy Turnings	*29.00-30.00*
Cut Structurals	38.00-39.00

Cast Iron Grades

No. 1 Cupola Cast	*44.00-45.00*
Clean Auto Cast	*44.00-45.00*
No. 1 Wheels	38.00-39.00
Stove Plate	*37.00-38.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	39.00-40.00
Malleable	44.00-45.00
Rails, Rerolling	*47.00-48.00*
Rails, Random Lengths	*41.00-42.00*
Rails, 2 ft and under	*45.00-46.00*
Rails, 18 in. and under	*46.00-47.00*
Railroad Specialties	*41.00-42.00*
Angles, Splice Bars	43.50-44.50

*Nominal

BIRMINGHAM

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Busheling	29.00-30.00
No. 2 Bundles	27.00-28.00
Machine Shop Turnings	25.00-26.00
Mixed Borings, Turnings	26.00
Short Shovel Turnings	27.00-28.00
Cast Iron Borings	24.00-25.00
Bar Crops and Plate	37.00-38.00
Cut Structurals	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	*38.00-39.00*
Stove Plate	*33.00-34.00*
No. 1 Wheels	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	35.00
R.R. Malleable	nominal
Rails, Rerolling	44.00-45.00
Rails, 2 ft and under	nominal
Angles and Splice Bars	*40.00-41.00*

ST. LOUIS

No. 1 Heavy Melt. Steel	$36.00-38.00
No. 2 Heavy Melt. Steel	33.00-34.00
No. 1 Bundles	36.00-38.00
No. 2 Bundles	33.00-34.00
No. 3 Bundles	29.00-30.00
Machine Shop Turnings	23.00-24.00
Short Shovel Turnings	26.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-41.00
Charging Box Cast	36.00-38.00
Heavy Breakable Cast	38.00-39.00
Brake Shoes	37.00-39.00
Clean Auto Cast	40.00-42.00
Burnt Cast	35.00-36.00

Railroad Scrap

R.R. Malleable	39.00-41.00
Rails, Rerolling	52.00-53.00
Rails, Random Lengths	41.00-43.00
Rails, 3 ft and under	47.00-49.00
Uncut Tires	41.00-43.00
Angles, Splice Bars	46.00-48.00
Railroad Specialties	45.00-46.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Bundles	18.00
No. 2 Bundles	17.00
No. 3 Bundles	15.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Rails, Random Lengths	22.00

SEATTLE

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	17.50
Nos. 1 & 2 Bundles	18.00
No. 3 Bundles	16.00
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50-30.00
Cut Structurals	27.50-30.00

Cast Iron Grades

No. 1 Cupola Cast	27.50
Heavy Breakable Cast	27.50
Stove Plate	25.00
Unstripped Motor Blocks	25.00
Malleable	27.50
Brake Shoes	25.00
Clean Auto Cast	30.00
No. 1 Wheels	30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	21.00
Railroad Malleable	27.50
Rails, Random Lengths	21.00
Angles and Splice Bars	21.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	30.50

Cast Iron Grades

No. 1 Cupola Cast	38.00-39.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Rails, Rerolling	33.00

HAMILTON, ONT.

(Delivered prices)

Heavy Melt.	$30.00
No. 1 Bundles	30.00
Mechanical Bundles	28.00
Mixed Steel Scrap	28.00
Mixed Borings, Turnings	23.00
Rails, Remelting	30.00
Rails, Rerolling	33.00
Busheling	24.50
Bushelings new factory, prep'd	28.00
Bushelings new factory, unprep'd	23.00
Short Steel Turnings	23.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.

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Sheets Strip . . .

Sheet and Strip Prices, Page 105 & 106

Cleveland—Supply of light, flat-rolled products will continue tight into fall. Producers will enter third quarter booked solidly for the period. Little summer production will be available for new business. Vacation shutdowns will afford little relief since consumers will use the layoff period to accumulate stocks. Tone of the market is strong, but no general price advance looms. Consumers, however, increasingly are buying in the premium markets. Last week Greer Steel Co. increased cold-rolled strip $7 per ton following similar action by several other makers. Mahoning Valley Steel Co. withdrew from the open sheet and strip market.

Pittsburgh—Two nonintegrated producers of electrical and motor grades of silicon steels have withdrawn from the market. What little tonnage both will furnish in future will be priced at the higher dynamo grade quotation. This situation is attributed to exorbitant scrap prices which in turn have forced sharp advance in sheet bar quotations produced from same. One of these interests is sold through balance of this year on cold-rolled sheets and silicon steels, a situation which will be further accentuated by indicated ⅓-reduction in allotments of semifinished for August due to July vacations and carryover tonnage of major supplier. Sharon Steel has advanced cold-finished spring steel price, within 0.26 to 0.40 per cent carbon range, to $4.50 per 100 base or $7 per ton same as on cold-rolled carbon strip. Other interests may follow soon. Cold-rolled strip producers in Valley area have advanced prices $7 per ton to $4.50 base.

Reflective of the impact on costs of recent increases in zinc prices Wheeling Steel Corp. has raised prices on its line of galvanized ware an average of 7.5 per cent.

New York—Despite heavy pressure, sheet sellers have not yet opened books for fourth quarter. Some have cut back on allocations. However, even quoting more or less on a monthly basis, most mills have allocated tonnage for the next three months and therefore are practically out of the market. Some galvanized sheets are coming in from Belgium at prices somewhat lower than domestic.

John A. Roebling's Sons Co., Trenton, N. J., has advanced cold carbon strip $7 a ton.

Boston—With further cuts in July allocations more consumers of flat-rolled items are confronted with shortages. Inroads on hot-rolled, pickled and oiled quotas are deep. Considering carryovers and vacation production losses most mills are overbooked for next quarter. Government locker order requires close to 10,000 tons of cold-rolled and 1 x 1 angles. One shop needs nearly 1000 tons with delivery of lockers scheduled to start in six to eight weeks.

Philadelphia—Stringency in sheets and strip is forcing some consumers to curtail production. In certain cases they have suspended entirely for the present.

Chicago—Sheet users are fearful they may have to scale production back drastically before summer ends unless some easing in supply occurs. Scattered reports indicate seasonal cuts in refrigerator production under way, but elsewhere demand is rising.

Cincinnati—Allotment of sheets for third quarter from district mills discloses heavy carryover and inability to meet all consumer demands. Full production schedules throughout the year are expected.

St. Louis—Sheet demand is unremitting with no indication of softening before the yearend.

Los Angeles—Importers are actively seeking orders, but most fabricators are slow to turn to foreign steel to ease shortages.

San Francisco—Demand for cold-rolled and galvanized sheets continues heavy and no signs are seen the squeeze on fabricators will ease soon.

Steel Bars . . .

Bar Prices, Page 105

Pittsburgh—Vacation shutdowns in July will accentuate unbalanced bar demand-supply situation which has become more pronounced in recent weeks due primarily to heavy production schedules among automotive, appliance and other important consumer groups. Cold finishers are operating 70 to 80 per cent of capacity.

New York—Carbon bar specifications extend into fourth quarter. One producer is virtually committed for remainder of the year on small size rounds and flats and has only a small opening left for September in large sizes. Consumers show willingness to place orders as far ahead on smaller sizes as producers will permit.

Boston—While no general price increase is expected some advance in stainless and nickel alloys would not be unexpected. Bar orders are heavy, notably smaller sizes. Forge shop needs are sustained. Government shops are asking for larger tonnages.

Philadelphia—Carbon bar demand has taken a further sharp spurt, falling in behind sheets, strip and pipe. Small sizes are particularly tight. Principal eastern bar producer has not yet opened books for fourth quarter.

Cleveland—Bar mill operations are hampered by lack of adequate semi-finished steel supplies. Production turns are being lost and, with output limited, merchant bar sellers are unable to meet demand. Deliveries extend throughout the summer. Carryover tonnage into third quarter will absorb a large part of that period's production. Cold-finished bars are increasingly tight, due chiefly to the fact cold-finishers are unable to obtain enough hot bars.

Chicago—Bar stocks are low and unbalanced. Delays in mill deliveries force buyers to seek quick help from warehouses and sometimes use substitute sizes and grades. Write-off of several weeks' July production to catch up on arrearages will squeeze some consumers. Rerollers are hoping foreign imports of rerolling rails will help them over the scrap price crisis. Borg-Warner's Franklin Steel Division, Franklin, Pa., increased its rail steel merchant bar price to 3.45c effective June 19.

Plates . . .

Plate Prices, Page 105

New York—Most plate producers are not far behind on commitments, but backlogs are becoming increasingly extended.

Boston — Some plate mills are more selective in accepting new orders and are limiting the ratio of lighter gages per order. Bulk of requirements is for lighter carbon sizes. Small tank demand is heavier than expected.

Pittsburgh — Unbalanced demand-supply situation in plates approaches that of light flat-rolled steel items. Leading consumers include transmission pipe lines, followed closely by requirements for underground and elevated tanks, barge and heavy machinery construction, and to growing extent for freight cars.

Philadelphia—Platemakers are out of the market on light gages for third quarter. They report steadily increasing backlog on heavier gages on which they have little to offer before late August.

Chicago—Contract for the pipe in a 1331-mile natural gas pipeline from Texas fields to the Chicago area, has been awarded A. O. Smith Corp., Milwaukee. The line will be completed by fall next year, a major portion of the pipe being fabricated at A. O. Smith Corp. of Texas' new mill at Houston. Not yet in operation, this mill, subsidiary of A. O. Smith and Sheffield Steel Corp., will fabricate 30-in. pipe for the project. It is estimated the order amounts to $50-60 million.

Seattle—Plate shops have considerable volume in small jobs for pipe and tank projects, but no large contracts are up for bids. Scarcity of sheets is a handicap, but some plants have fair inventories.

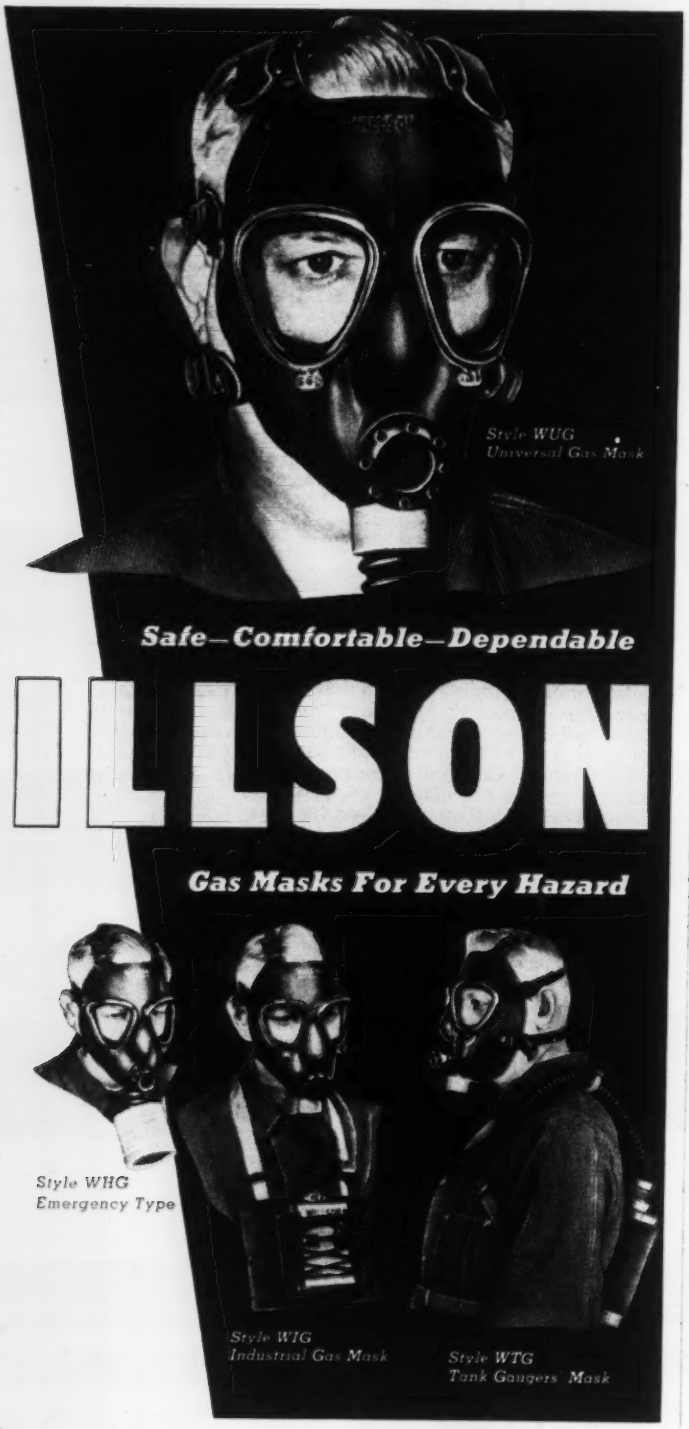
Wire . . .

Wire Prices, Page 107

Cleveland — Wiremakers' order backlogs are heavy as second quarter closes. Tonnage carryover into third quarter will support high-level operations into the fall. Vacations next month will contribute to tightness in supply. Producers are giving serious thought to effecting upward price adjustments on galvanized wire products. Recent price changes in this market include adjustments to competitive levels on manufacturers' bright wire and wire rods by Buffalo Bolt Co. A change in its price on nails was effected by Angell Nail & Chaplet Co., now quoting column 111 as against 112 formerly.

Boston—While capacity for some specialties is taken through third quarter, low carbon wire schedules are less confused with delivery ranging from six to eight weeks. Most consumers of heading wire have better balanced inventories but are taking full allocations.

Pittsburgh — Wire producers are considering advancing galvanizing extras $7 per ton to offset higher zinc costs. Some easing in demand for nails has been felt in recent weeks although a shortage of roofing nails persists.



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Tin Plate . . .

Tin Plate Prices, Page 106

Pittsburgh—Easing in pressure for delivery of tin mill products is not indicated until fourth quarter. Sellers' and customers' inventory position is well below normal. Mill vacation shutdowns through July will accentuate the shortage.

Tubular Goods . . .

Tubular Goods Prices, Page 108

Pittsburgh—Galvanized pipe prices are being advanced to reflect sharp increases in the price of zinc. Effective June 22, Pittsburgh Tube Co. raised galvanized pipe $8 per ton, or 4 points lower discount on ½ in. through 4 in. for standard weight, reamed and drifted, and extra strong pipe.

Wheeling Steel and National Supply also advanced galvanized pipe quotations $6, or three points lower discount, on June 21 and 22, respectively. New discount schedule put into effect on June 22 by Fretz-Moon Tube Co., Butler, Pa., is as follows: 5.5 points on ⅛ and ¼-inch and 0.5 points for ⅜-inch. This represents a discount reduction of 3 points on ⅛-inch, 4 points on ¼-inch and 5 points on ⅜-inch.

Cleveland — Youngstown Sheet & Tube Co. and Republic Steel Corp. increased galvanized pipe $6 per ton to offset higher zinc prices amounting to around $100 per ton since pipe prices were last adjusted. The increase applies on pipe ½ in. and larger and became effective June 21. Recently Mercer Tube & Mfg. Co. increased its galvanized pipe prices $8 per ton.

St. Louis—Pressure on pipe mills to accept new business is heavier.

Semifinished Steel . . .

Semifinished Prices, Page 105

Pittsburgh—Tempo of demand for semifinished steel is indicated in report from one supplier that he has no additional tonnage to offer through remainder of year. High priced scrap has forced sharp upturn in semifinished prices for shipment to nonintegrated producers. Sheet bars, for example, are quoted within range of $70 to $85, which in turn has forced one hand mill operator to discontinue commercial production of electrical and motor grades of silicon steel.

Cleveland—Sheet bars are increasingly difficult to purchase from regular supply sources. Nonintegrated steelmakers, forced to cover requirements in the premium market, are paying considerably above the $58 mill price which until last week was considered representative of the market. Two nonintegrated mills have purchased 10,000 tons at $61. Of late, sheet bar sellers have been withdrawing from the market. Latest company to leave the market is Empire Steel Corp., Mansfield, O.

Due to the high cost of scrap Copperweld Steel Co. has withdrawn its published quotation on carbon forging billets, blooms and slabs. It had quoted $63 per net ton.

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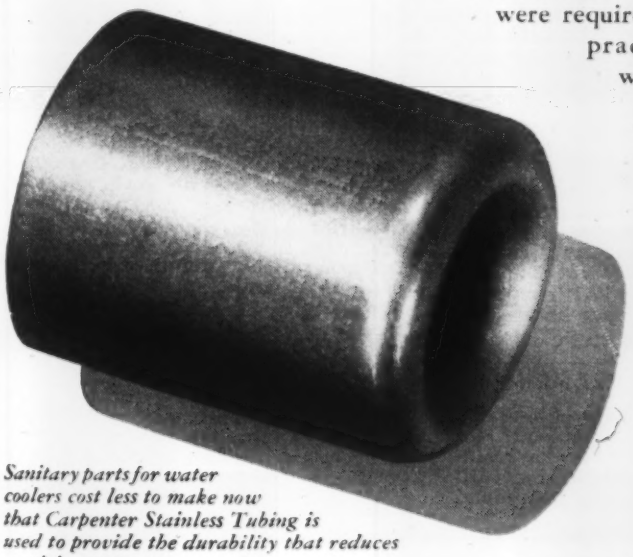

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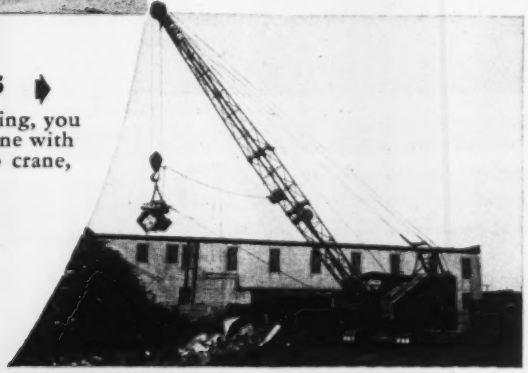

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 105

New York—Reinforcing bar demand is brisk. Bridge and road work dominate, although 1000 tons are pending for a municipal housing development in Queens and 800 tons were placed for a municipal sewerage disposal plant in Rockaway, Long Island.

Los Angeles — Stronger demand stems principally from public works and state highway projects.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 108

Milwaukee—City sewerage commission is considering purchase of Milwaukee Solvay Coke Co., owned by Milwaukee Gas Light Co. The plant's present sole customer of manufactured gas is the sewage disposal plant. It is presumed there will be no change in production of foundry and domestic coke.

Structural Shapes . . .

Structural Shape Prices, Page 105

New York—Producers of standard shapes are well booked ahead but they are, for the most part, fairly current with commitments. As for new orders, shape mills are now into early September on standard sections and late September on wide flange sections.

Johnson Drake & Piper Inc., this city, submitted a low bid of $4,979,047 on the general contract for the construction of an elevated section of the Major Deegan state expressway in the Bronx.

Poirier & McLane Corp., this city, submitted a low bid of $3,163,476 on the general contract for construction of the high bridge interchange on the Cross-Bronx expressway. Several thousand tons of structural and reinforcing bars are required for these projects.

Boston—Some structural mills are not taking additional orders until July 15, attempting to catch up on deliveries and revise rolling schedules. Deliveries on plain material average around 12 weeks.

Pittsburgh — Despite slight improvement in structural steel inquiries, many fabricators are operating below capacity, in some instances around 50 per cent.

Philadelphia—Of the major products, shapes are perhaps in best supply, although backlogs are a shade more extended.

Chicago—Heavy order backlog, including apartments, bridges and industrial work, is supporting fabricators' operations at high levels. Quoted prices are firming. Fabricators' backlogs average between two and five months.

LosAngeles — Competition among fabricators is intense but abundance of jobs has stabilized bidding practices and extreme price-shading.

Seattle—Fabricators are booking fair volume of jobs involving less than 100 tons each.

San Francisco—Despite seasonal pickup in demand, structural shapes are plentiful and no distress is expected.

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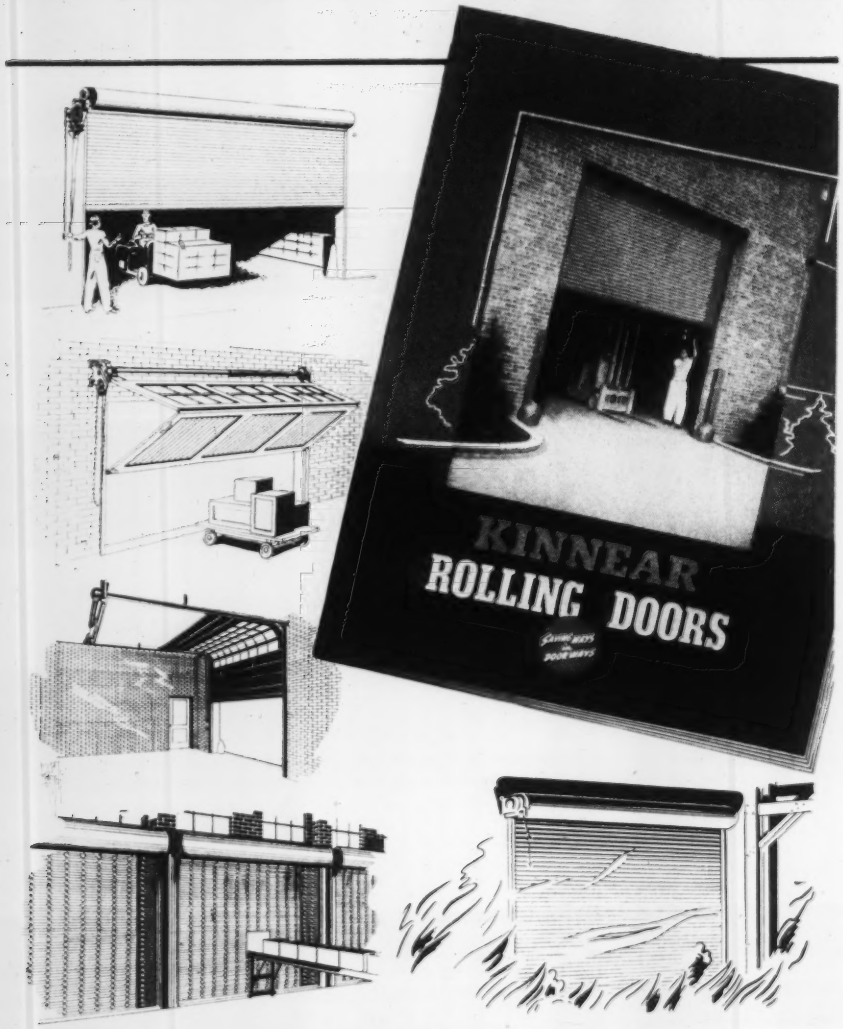

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KINNEAR ROLLING DOORS

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 108

Cleveland — Industrial fastener manufacturers are entertaining largest volume of business since 1948. Order backlogs are sufficiently heavy to support high-level operations through remainder of the year. Demand is coming from all directions, including jobbers who had permitted their stocks to drop to the danger point.

Pittsburgh—Demand for fasteners is expected to be well sustained throughout third quarter to meet heavy requirements from automotive and jobbing trade.

Pig Iron . . .

Pig Iron Prices, Page 104

Pittsburgh—Pig iron scarcity is growing more acute and no relief is expected until completion of Pittsburgh Coke & Chemical Co.'s blast furnace relining program around mid-July and of Shenango Furnace Co.'s Sharpsville, Pa., stack later in the month. Foundries short of iron have had little success supplementing supplies through purchases from other merchant foundry iron interests in Ohio, eastern Pennsylvania and other districts.

New York—Pig iron sellers look for a material easing in pressure next month, as foundries enter the vacation season. Ordering is not too brisk; in fact, there is not quite the concern over supplies there has been, especially now that the scrap market shows signs of stabilization. Lagging interest in foreign iron may be ascribed in part to somewhat higher prices than importers were quoting recently.

Boston—Substantial volume of pig iron currently melted by basic consumers is of foreign origin. Demand for foundry iron has improved little. Bulk is supplied by the Everett furnace under contract.

Philadelphia—Pressure for pig iron is definitely off. This is ascribed to increasing arrivals of foreign iron and stabilization of the scrap market.

Cleveland—Merchant iron specifications are active with foundries in this area engaged at the best level in months. Motor castings makers are especially busy but the general jobbing shops also are doing well.

Buffalo—A pickup in demand for railroad castings is noted here. Jobbing plants continue to work on a curtailed basis, but the rush of pig iron to motor casters continues to take all available merchant supply.

Chicago—Good business is seen by foundrymen for several months ahead. Pig iron is tight but melters report receipts balance outgo. Foreign iron, notably French, is being offered and some German material has been purchased. Prices are slightly higher than for the domestic product.

Cincinnati—Pig iron ordering is sustained despite vacation plans of foundries. Most recent expansion is in jobbers' melt.

St. Louis—Pig iron supplies continue tight and are shipped on a quota basis. Consumers are unable to accumulate a reserve. There are no signs of shrinking demand this summer.

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courtesy

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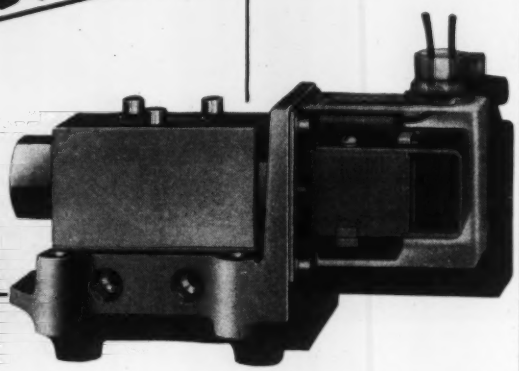

. . for air to 125 P. S. I.— or vacuum also low pressure hydraulic service

● These valves combine the utmost simplicity in design with rugged construction. They will give millions of cycles of highly satisfactory and efficient trouble-free service. Small solenoids, with short strokes work against the valve plunger, eliminating levers, links and pins. Low amperage requirement eliminates intermediate relays and simplifies electrical control circuits. Side or bottom pipe connections. Valve body and solenoid are both mounted on an aluminum base and can be removed without disturbing the piping. 2, 3, 4 and 5-way actions. ***Write for Data Sheet No. 1741.***

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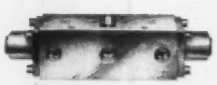
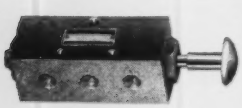
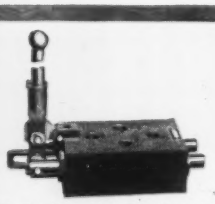


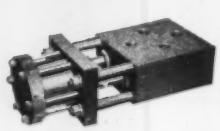
Single Plunger Valves—for air or low pressure hydraulic service. Lever, pilot, cam, diaphragm or solenoid operated. 2-way, 3-way, 4-way actions.



Series "O" and "OE" Valves—for air or hydraulic service up to 125 PSI. Push-pull, cam, pilot, diaphragm and solenoid operated. 1/8" and 1/4" pipe connections. 2-way, 3-way, 4-way and 5-way actions.



Hydraulic Valves—Up to 5000 PSI. Conservatively rated. 1/2", 3/4", 1" and 1 1/2" sizes. 2-way, 3-way, 4-way actions.



Hydraulic Valves—Up to 5000 PSI. Pilot cylinder operated. 1/2", 3/4", 1", 1 1/2" 2", 2 1/2" 3" and 4" sizes 2-way, 3-way, 4-way actions.

Quick-As-Wink Control Valves

THE HIGHER THE PRESSURE THE TIGHTER THE SEAL

Manufactured by **C. B. HUNT & SON, Inc.**

1923 East Pershing Street, Salem, Ohio

Scrap . . .

Scrap Prices, Page 112

Philadelphia—Scrap market is easier with prices declining further. Domestic supplies are larger, although dealers are not disposed to dump tonnage as long as steelmaking continues at present high levels. Imports also are increasing. One eastern consumer has received one shipment against recent orders and has two or three cargoes nearing the seaboard. Carnegie-Illinois Steel Corp. also has just concluded a purchase of 100,000 tons of German scrap.

New York—Scrap brokers' buying prices are lower on several grades. Consumer demand continues fairly active, although shipments are being handicapped by growing shortage of gondolas.

Boston — Steel scrap prices are lower. Although supply of good grade steel scrap is limited, buying has slackened and usual differentials between grades is off.

Pittsubrgh — Purchase of nearly 100,000 tons of good quality open-hearth grades of German scrap by Carnegie-Illinois Steel Corp. for shipment to the corporation's mills here at delivered prices as low or lower than the recent high of $46 paid for No. 1 heavy melting is expected to assure capacity ingot operations over coming months. This purchase may be an important factor in depressing scrap prices to more realistic levels.

Buffalo—A leading foundry purchased No. 1 heavy melting steel scrap within a range of $39.50-$40, substantiating a recent nominal reduction of $2 to $2.50 a ton. Undertone is weak due to absence of mill buying.

Cleveland—Undertone of the scrap market is slightly easier. Heavy melting steel is quoted nominally $40.50, off $1, while No. 1 railroad heavy melting is quoted nominally $46, off $2.

Detroit—Automotive lists coming out this week for bids carry in many cases record tonnages, leading some brokers to expect lower prices. Onset of vacation periods, two-week closings of local electric furnace plants and collapse of special "deals" involving earmarking of scrap are further depressing factors.

Chicago—Scrap is flowing so freely some mills are asking shippers to hold off until yards can be cleared of cars awaiting unloading. A major mill has purchased upwards of 50,000 tons of No. 1 heavy melting at $38, No. 2 at $36 and No. 2 bundles at $33.

Delivery in July of a substantial tonnage of rerolling rails from abroad will mark the first time Calumet Steel Division, Borg-Warner Corp. and the Chicago Heights mill of Inland Steel Co. have purchased foreign material for rerolling.

St. Louis—Scrap market has leveled off under a lull in buying. Mill ground stocks are from 60 to 75 days while foundry inventories are fair.

Seattle—Mills are receiving ample scrap supplies. A shortage of cast iron scrap, quoted $25-$30, is noted with foundry operations active.

San Francisco—Mills' stockpiles are large and most purchases are made for replacement purposes.

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Warehouse . . .

Warehouse Prices, Page 109

Boston—Stocks of flat-rolled are low with distributors moving tonnage as fast as it is received from the mills. Demand for other carbon products is heavy but in most cases inventories are in better shape. Galvanized prices have advanced in line with the increase in zinc.

Philadelphia—Advances of $2 per ton on hot carbon bars and $4 a ton on shapes and plates are being put into effect by local warehouses.

Cleveland—High volume demand continues to be entertained by local distributors. Warehouses are having difficulty satisfying all the orders coming to them, especially for light, flat-rolled products. Plates also are in limited supply, conditions having substantially worsened due to withdrawal from the market, at least temporarily, of two large producing interests.

Seattle—Warehouse volume is at year's peak. Stocks are well rounded except for sheets. Structurals are tighter, eastern shipments being 12 weeks forward. Coast mills are unable to meet demands.

Los Angeles — Undiminished consumer pressure for steel coupled with allocation by mills of pipe, sheet, plate, and cold-rolled strip keeps warehouse stocks low in these items.

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LOWER OPERATING COSTS

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Michiana Alloy Castings—whether pots, boxes, retorts, muffles, tubes, rails, rolls, shafts, chains—can help in keeping your operating costs down by providing dependable high heat-hour service.

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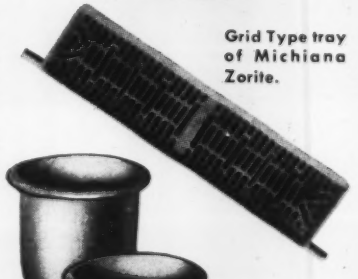
Michigan City, Indiana

Retort with open end


Grid Type tray of Michiana Zorite.

Michiana Pots used in bearing production.

Michiana Retort—Ni 34-38, Cr 13-17 Heat-Resistant Alloy.

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Heat Resistant and Stainless Steel
ALLOY CASTINGS

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5100 tons, cut-off between Kansas City, Kans. and Chicago, Burlington Railroad; 3700 tons to American Bridge Co., 1400 tons to Bethlehem Steel Co.

1600 tons, Rittenhouse Square South apartment, to Bethlehem Steel Co.

1075 tons, telephone building, Newark, N. J. to Schacht Steel Construction Inc., New York.

550 tons, Columbia Hospital, Hudson, N. Y., to Harris Structural Steel Co., New York.

330 tons, state bridge, Farnhurst interchange, Delaware, to Bethlehem Steel Co.

360 tons, building, Bergen Evening Record, Hackensack, N. J., through Walter Kidde & Co., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

305 tons, additions and alterations, state hospital, Taunton, Mass., to Groisser & Shlager Iron Works, Boston, through Gilbane Building Co., Providence, R. I., general contractor.

300 tons, sewage treatment plant, Department of Public Works, Rockaway, New York, through Merritt-Chapman & Scott Corp., that city, to Jones & Laughlin Steel Corp., Pittsburgh.

260 tons, telephone building, 97th street, Manhattan, New York, to Lehigh Structural Steel Co., Allentown, Pa.

205 tons, Pennsylvania Railroad overpass, Wilmington, Del., to American Bridge Co., Pittsburgh.

200 tons, clear span cantilever and suspended span I-beam bridge, underpass, Mill street connector, Shelton-Derby-Ansonia expressway, Derby, Conn., to Bethlehem Steel Co., Mariani Construction Co., Westport, Conn., general contractor.

165 tons, state bridges, Darien and Glastonbury, Conn., to Phoenix Bridge Co., Phoenixville, Pa.; Brunalli Construction Co., Southington, Conn., general contractor.

125 tons, four units mitre gates and operating mechanism for McNary dam, to Western Gear Works, Seattle.

100 tons, housing project, Hartford, Conn., to New England Iron Works, New Haven, Conn.; F. H. McGraw & Co., Hartford, general contractor.

100 tons, three-span continuous I-beam bridge, Sullivan avenue, Shelton-Derby-Ansonia expressway, Shelton, Conn., to Bethlehem Steel Co.; Mariani Construction Co., Westport, Conn., general contractor.

100 tons, laboratory building, Williams College, Williamstown, Mass., to Groisser & Shlager Iron Works, Boston, through Aberthaw Co., Boston, general contractor.

STRUCTURAL STEEL PENDING

6410 tons, Major Deegan state highway, 50-2, Bronx, New York; bids closed June 21.

3550 tons, contract No. 54, New Jersey Turnpike, Hudson county, bids July 6; also required are 5180 ft of steel piles and 2725 feet of metal railing.

1450 tons, contract No. 33, New Jersey Turnpike bridge work, Gloucester, Burlington and Camden counties, Francis A. Canuso & Sons, Philadelphia, low on general contract, bid $1,747,280.

1375 tons, state highway bridge, Allegheny county, Pennsylvania, bids July 7.

1130 tons, contract 35, New Jersey turnpike, Hudson county, Koppers Co. Inc., (Metal Products Division) Baltimore, low on general contract; bid $870,825.

1000 tons, state highway bridge, Lancaster county, Pennsylvania; bids June 30.

1000 tons, Pennslyvania turnpike, contract 31-A, Allegheny county; Ralph Meyers, low on general contract.

620 tons, multiple span rolled beam viaduct.

465 tons, five-span double leaf bascule bridge with I-beam approaches, Grand Isle-North Hero, Vt.; bids June 29, Montpelier. Work also requires 5814 sq ft grid flooring, 175 tons billet steel for counterweights, 170 tons steel punchings.

447 tons, contract No. 24, New Jersey Turnpike, Salem and Gloucester counties, general contract awarded to Peerless Construction

Co., New York; bid $281,885.55.

382 linear ft, overpassing Main street, Shelton - Derby - Ansonia expressway, Derby, Conn.; bids Jan. 26, Hartford.

400 tons, addition to anchorage, Delaware River Memorial bridge; Lewis & Bowman, North Carolina contractors, low on contract 7-A, requiring 355 tons; Whiting-Turner, Baltimore, low on contract 7-B, requiring 45 tons.

50 tons, store, W. T. Grant Co., Worcester, Mass.

90 tons, Pennsylvania turnpike, 29-A, Lawrence county; bids July 6.

298 tons, state highway bridge, Allegheny county, Pennsylvania; bids June 30.

200 tons, addition, state hospital, Woodville, Pa.; bids July 6.

135 tons, Pacific Lutheran College, Parkland, Wash.; bids in.

100 tons plus, gratings, bus supports, etc., and bulkhead frame for Hungry Horse dam; bids to Bureau of Reclamation, Denver, July 6 and 13, respectively.

Unstated, Snake river interstate bridge; bids to Boise, Idaho about Aug. 1.

Unstated, Project 57, military installation; Morrison-Knudsen Co., Seattle, low to U. S. Engineer, Seattle, $785,826.

Unstated, Project 60, military installation; Utah Construction Co., Richmond, Cal., low to U. S. Engineer, Portland, Oreg., $751,254.

Unstated, addition to Security Market, Seattle; bids in.

Unstated, Columbia river bridge, involving seven 100-foot spans; bids soon to Atomic Energy Commission.

Unstated, doctors' building, Portland, Oreg.; bids soon; plans by the Austin Co., Cleveland.

Unstated, Salvage river bridge, Alaska, involving seven I-beams, also concrete piers, etc; bids to Alaska Road Commission, Juneau, Alaska, July 17.

PLATES . . .

PLATES PLACED

1382 tons, hull plates, Navy Department, to Worth Steel Co., Claymont, Del., $128,141.32.

PLATES PENDING

Unstated, 54 in. steel siphon and pump units, East low canal, Columbia Basin project; bids to Bureau of Reclamation, Ephrata, Wash., June 26.

Unstated, steel water tank, covered; bids to Alma K. Catto, clerk, Shelton, Wash., July 18.

PIPE . . .

CAST IRON PIPE PLACED

100 tons, Moses Lake, Wash., system improvement, to H. C. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

250 tons, Ault Field, Whidbey Island, Wash., Navy project, 7500 ft 12 in; M. Malaspina, Seattle, low general contract $21,454.

RAILS, CARS . . .

RAILROAD CARS PLACED

Missouri Pacific, 200 seventy-ton hopper cars, to its DeSoto, Mo., shops.

Seaboard Air Line, 200 seventy-ton phosphate cars, to Pullman-Standard Car Mfg. Co., Chicago.

Spokane, Portland and Seattle, 12 caboose cars, to Northern Pacific shops.

RAILROAD CARS PENDING

Detroit Street Railways, 80 electric trolley coaches; purchase authorized.

LOCOMOTIVES PLACED

Lehigh Valley, 38 diesel locomotives; 14 to replace road freight steam locomotives and 24 to be used in switching service. Orders placed with American Locomotive Co., New York; Baldwin Locomotive Works, Eddystone, Pa.; Electro-Motive Division, General Motors Corp., LaGrange, Ill.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1500 tons, state bridge work, upper Manhattan, New York county, New York; bids closed June 21.

1170 tons, additions and alterations, state hospital, Taunton, Mass., to U. S. Steel Supply Co., Boston, through Gilbane Building, Providence, R. I., general contractor.

1000 tons, foundation, Pomonock municipal housing development, Queens, New York; bids asked.

900 tons, Major Deegan state highway, 50-2, Bronx, New York; bids closed June 21.

800 tons, sewerage treatment plant, Department of Public Works, Rockaway, New York, through Merritt-Chapman & Scott Corp., that city, to Jones & Laughlin Steel Corp., Pittsburgh.

215 tons, Lyman Run lake and dam, Pennsylvania, to Jones & Laughlin Steel Corp., Pittsburgh.

200 tons, Public School 125, Bronx, New York, to Jones & Laughlin Steel Corp., Pittsburgh.

100 tons, Green river bridge near Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

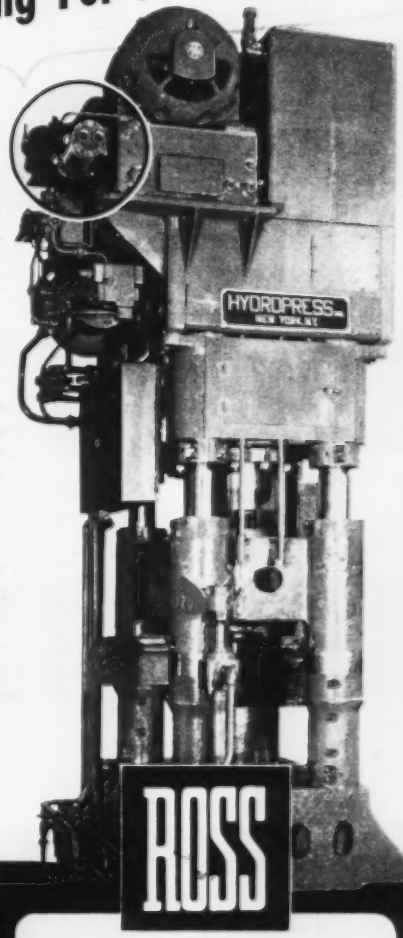
REINFORCING BARS PENDING

1935 tons, Cachuma dam, California; bids July 6, Bureau of Reclamation, Goleta, Calif.

1005 tons, traffic interchange, James J. Storrow memorial drive, Boston; Farina Bros., Newton, Mass., low, $1,062,725, Metropolitan District Commission, Boston. Work also includes 350 tons, structural steel.

737 tons, contract No. 54, New Jersey Turn-

HOW TO REMOVE TEMPERATURE RISKS When Pressing For A Profit



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A product of standardization itself, Type BCF has been accepted as standard by Hydropress, Inc. of New York, builders of heavy hydraulic machinery, for use where vital systems demand a constant supply of hydraulic fluid at the most effective operating temperatures. Installation is simplified here, just as it is for operators of other presses who install their own, by Type BCF's marked adaptability to the size and location of mounting space.

When planning addition of new hydraulic equipment or considering means of improving existing equipment, men throughout industry recognize Ross BCF Exchangers as key accessories that make other products better. You will, too.

FREE — Details of all-copper and copper alloy Type BCF Exchangers are available in Bulletin 1.1K1. Write.

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In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

Serving home and industry— AMERICAN STANDARD • AMERICAN BLOWER
CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

pike, Hudson county, bids July 6.

561 tons, state highway bridge work, Allegheny county, Pennsylvania, bids July 7.

200 tons, Washington state highway projects; bids to Olympia, July 6.

55 tons, five-span double leaf bascule bridge, Grand Isle-North Hero, Vt.; bids June 29, Montpelier.

FERROALLOYS

(Continued from Page 109)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon. Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $167 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $183 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

This valve is operated by the linear expansion and contraction of the three sets of tubes spaced around the rigid steel flange. When steam is passed through the tubes, thermal expansion frees the goggle plate. When the steam is removed, contraction closes the flanges against the goggle plate. Diameters of 72" to 120".

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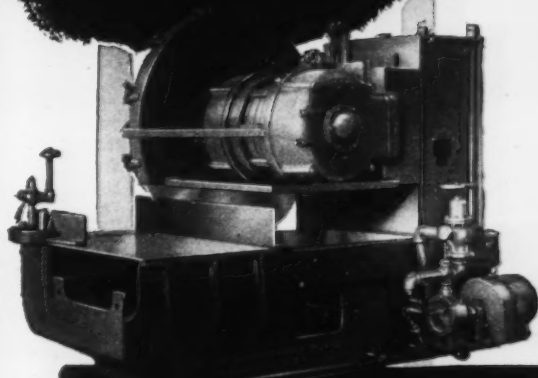
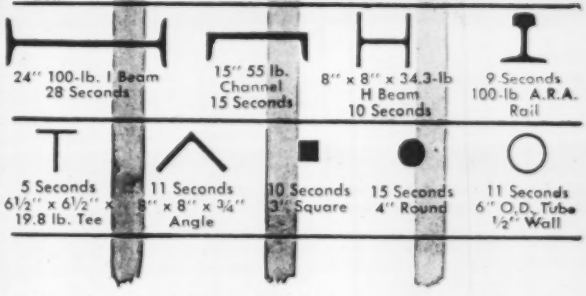
Modern Sawing



with KLING *HIGH SPEED FRICTION SAWS*



Friction sawing is one of few mechanical processes which employ the heat of friction in a useful manner. It concentrates heat on the material to be severed at a rate which is faster than it can absorb heat. The immediate temperature rise of the contact surface is so great that its strength is reduced considerably lower than that of the colder blade rim. This heated surface is readily removed by the blade and permits complete severing of the material rapidly with no loss of metal from the blade.

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Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c per lb; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min. C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%; Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.0c per lb of alloy; ton lots 18.0c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb. contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb. contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

Metalworking Briefs

CONSTRUCTION, ENTERPRISE ORGANIZATIONAL CHANGES

Alabama

Southern States Iron Roofing Co., Savannah, Ga., established a district sales office in Birmingham under the managership of Charles A. Rea. John P. Starnes was named manager of the Nashville district office.

California

Contracts were awarded for construction of the $21 million Statler Hotel and office building in Los Angeles. Robert E. McKee, **General Contractor Inc.,** Los Angeles and El Paso, received a contract for $15 million to build the 1275 room hotel. Architects are Holabird and Root and Burgee of Chicago and William Taber of New York. Construction is to begin July 5 with completion scheduled for 1952. **Consolidated Western Steel Corp.,** Los Angeles, and **American Bridge Co.,** Pittsburgh, have been awarded $1.5 million in contracts for fabricating and erecting the 7200 tons of steel required for the 13 story structure. Other contracts awarded included $3 million to **Mehring and Hanson,** Los Angeles, Chicago, and Washington, D. C., for heating, ventilating, plumbing, and pipe coverings; $1.1 million to **Stetson Electric Co.,** Los Angeles, for electric work; $900,000 to **Electric Elevator Maintenance Ltd.,** Los Angeles, for elevators, dumbwaiters, and electrical stairways. Cost of the structure of $12,000 per room compares with $9000 per room for the Washington Statler built in 1942.

California

Marshall Steel Co., LaGrange, Ill., appointed **Liberty Equipment & Supply Co.,** Los Angeles, its West Coast jobber. Marshall is a manufacturer of ground flat stock tool steel.

California

Behr-Manning Corp., New York abrasive manufacturer, plans to erect a warehouse and distributing plant in San Francisco early next year. The project will cost about $150,000. The company is building a plant in Los Angeles and has just completed one in Seattle.

Delaware

DeRewal International Rare Metals Inc., Philadelphia, will construct a plant for the extraction of rare metals at Leipsic, Del.

Delaware

Copco Pacific Ltd., machinery, was chartered by the corporation department of the secretary of state's office, Dover, Del. Corporation Trust Co., Wilmington, Del., is serving as the principal office.

Georgia

A. Milne & Co.—tool steel specialists—New York, opened a sales office at 735 Spring St. N. W., Atlanta, under the direction of Harold F. Dicks.

Illinois

Motor Products Corp., Detroit, is erecting a $4 million refrigerator manufacturing plant west of Lake Bluff, Ill.

Illinois

Stronghold Screw Products Inc., Chicago, acquired the entire inventory of fasteners of the Corbin Screw Division, **American Hardware Corp.,** New Britain, Conn. This inventory, consisting of many millions of screws, bolts and nuts will be added to the stock Stronghold carries at its factory and warehouse in Chicago, and warehouses in Cleveland and Atlanta.

Illinois

Strick Co., Philadelphia, purchased the Chicago Transit Authority's Burnside car barn which will be transformed into a truck trailer manufacturing plant.

Illinois

Chicago Eye Shield Co., Chicago, appoints **Guardian Safety Equipment Co.,** Birmingham, as distributor for the states of Alabama and Mississippi. Mr. Howard Freed, who formerly serviced industrial plants in Ohio for Williams & Co., will head the new distributorship.

Illinois

Hubbell Corp. announces removal of its offices and plant to Hawley road, Mundelein, Ill.

Illinois

Charles Bruning Co. Inc., Chicago, manufacturer of blue prints and drafting equipment, will install its Machine Mfg. Division in a one-story building which has been acquired at 4321 N. Knox Ave., that city.

Maine

Ekco Products Co., Chicago, kitchen tool and houseware items manufacturer, plans to rebuild the factory of its subsidiary, **E. L. Tebbets Spool Co.,** Locke, Me., at a cost of $400,000. The plant was destroyed by fire Feb. 26.

Maryland

Baltimore Porcelain Steel Corp., Mt. Winans, Md., maker of porcelain enamel sheet steel products, acquired the Freezer Division, **Whiting Corp.,** Harvey, Ill. Equipment of this division is being set up in the Maryland plant, where home deep freezers will be produced. Products of the corporation will be marketed by the **Whiting Appliance Co.,** a new subsidiary. The Baltimore company is developing a sheet steel porcelain tile, and probably will start its manufacture in August.

Maryland

Maryland Dry Dock Co., Fairfield, Baltimore, awarded a contract to the **Arundel Corp.,** Baltimore, for the rebuilding and enlarging of its pier No. 3. One objective of this program is to equip the pier with larger cranes.

Maryland

Yankee Engineering Specialty Co., Baltimore, is enlarging its plant facilities. The company manufactures materials handling equipment. In addition to an increased demand for conveyors, it has secured a large subcontract for rearmament items.

Michigan

Acheson Colloids Corp., Port Huron, Mich., awarded a building contract to **Austin Co.,** Cleveland. This is a continuation of a plant expansion program which began in 1942. The new structure, to be ready for occupancy Aug. 1, 1950, will house production equipment of the Dispersed Pigments Division.

Michigan

Cleco Division, **Reed Roller Bit Co.,** Houston, Tex., opened a factory branch and warehouse at 2832 E. Grand Blvd., Detroit. Cleco Division, manufacturer of air tools, air line

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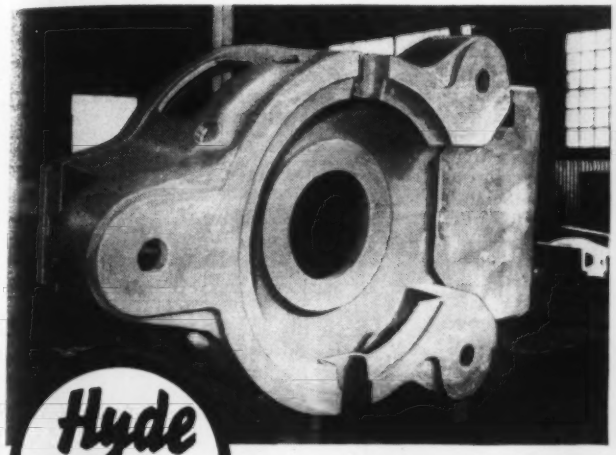

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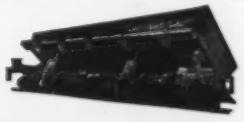

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couplings, valves, chisels and other accessories, appointed Jim Reed and Roger Winship as factory representatives for the Detroit area.

Minnesota

Poor & Co., Chicago maker of railroad track maintenance equipment, bought controlling interest in **Pioneer Engineering Works Inc.,** Minneapolis. The latter company makes highway building machinery.

Missouri

Sound motion picture, **"One Ounce of Safety,"** is available for purchase by prospective users from its producer, Hy-Test Safety Shoe Division, **International Shoe Co.,** St. Louis. Primary purpose of the film is to give plant safety directors a forceful "visual tool" that can be used to impress upon workers the importance of wearing protective footwear. The cost is $47.50 per print.

New York

Ford Motor Co.'s assembly plant in Buffalo will hire about 1000 additional workers in July when it places production on a two-shift basis. Production at the plant will reach the highest level since the days of the model-T.

New York

Teal Machine Co., Rochester, N. Y., petitioned the Penfield, N. Y., town board for purchase of a town-owned site. The company may build a plant there.

New York

Industrial Division, **Detecto Scales Inc.,** Brooklyn, N. Y., appointed as representatives: Anchor St. Louis Scale Co., St. Louis; Patterson Scale & Equipment Co., Jacksonville, Fla.; C. H. "Jack" Vilm, Denver; R. W. Hooker, Phoenix, Ariz.

Ohio

Kirk & Blum Mfg. Co., Cincinnati, purchased the real estate and facilities, including 11 buildings, of the Cincinnati Planer Co., Oakley, Cincinnati. The sale was by Giddings & Lewis Tool Co., which purchased the planer company in 1948 and moved production to Fond du Lac, Wis.

Ohio

Ohio Equipment Co. Inc.—intraplant materials handling equipment—1367 E. Sixth St., Cleveland 14, will move July 1 to larger quarters located at 1220 W. Ninth St., Cleveland 13.

New York

DeLaval Separator Co., manufacturer of farm and dairy equipment, will move its offices from New York to Poughkeepsie, N. Y., as soon as its new office building is completed. Main factory of the company is in the latter city.

Pennsylvania

Industrial Brownhoist Corp., Bay City, Mich., opened a sales office at 1422 Oliver Bldg., Pittsburgh. The office is under the direction of J. A. Peppard, district manager of the Pittsburgh and Cleveland territory.

Pennsylvania

Lebanon Steel Foundry, Lebanon, Pa., effected licensing agreements with **Timken Roller Bearing Co.,** Canton, O., to produce and sell a patented heat-resistant superalloy known by the trademark "16-25-6," both patent and trademark registrations being owned by Timken. Adaptation of the material to steel casting process is under way to broaden the company's field of operations in the production of jet engine components and other heat-resistant steel castings of aircraft quality.

SOUNDPROOFED TEST CHAMBER: In test cells like this are conducted the endurance test runs on the engine developed by McCulloch Motors Corp., Los Angeles, for radio-controlled target aircraft. A new research building, part of McCulloch's continuing expansion program, houses two cells of this type. Four more were constructed in the research annex for testing engines with propeller loads. The engines weigh only 74 pounds, can develop 56 horsepower

Wisconsin

Walker Mfg. Co. acquired the **DeLuxe Products Corp.,** La Porte, Ind., and will operate it as a separate division with its present identity. The Walker firm makes automobile jacks, exhaust systems, oil filters and cartridges. DeLuxe also makes oil filters and cartridges.

Wisconsin

Allis-Chalmers Mfg. Co., Milwaukee, entered into a nonexclusive agreement with the **Picker X-Ray Corp.,** New York, covering the sale and service of Allis-Chalmers' betatrons for both medical and industrial applications. The Picker firm has its manufacturing facilities at its Waite Mfg. Division, Cleveland.

Canada

A $1 million expansion and improvement program at the Toronto, Ont., plant of **Goodyear Tire & Rubber Co.,** Akron, is scheduled to begin immediately.

Canada

Canadian Industries Ltd., Montreal, plans to build an explosive plant near Calgary, Alta. Estimated cost is between $3 million and $4 million.

Canada

Fire damaged the **Ontario Metal Specialties Co.'s** plant in Bronte, Ont., June 14. Estimated damage exceeds $100,000.

Handle Scrap Faster—Easier

This Burro is handling scrap faster and easier because it moved itself and several cars to the job quickly—and started work without delay. Burros equipped with magnet, clamshell bucket, dragline bucket, tongs or hooks are saving time and money on many jobs in every type of industry. Their powerful draw bar pull (7500 lbs.) and fast travel speeds (up to 22 MPH) make them efficient switch engines too—you can spot cars where and when you want them at a moment's notice. There's no waiting time when a Burro is on your track.

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This continuous, high-speed 10-inch mill is the most advanced bar-rolling equipment in operation today. A mechanical marvel, it can reduce a billet to a finished bar in approximately 20 seconds. The hot steel travels continuously in a straight line from the furnace all the way through 18 roll stands to the run-out table with no reversing or looping-back required.

There are four principal reasons why this mill produces alloy steel bars of superior quality.

1. Alternate vertical and horizontal rolls in the roughing stands are arranged to eliminate any twisting or deflection in the bars.

2. Guides are designed to avoid scratching or damaging the surface of the bars between passes.

3. The heating furnaces that feed into the mill are designed to hold billets at rolling temperature for relatively short periods, resulting in less scale and decarburization.

4. The high rolling speeds minimize the temperature drop and help to develop a uniform tolerance and section in the finished bars.

This mill is typical of the many postwar improvements Bethlehem has made in its facilities for producing alloy steels. Also included are: modern soaking pits, hot scarfing machines, controlled-cooling facilities, heat-treating furnaces for bars in straight lengths and coils, and finishing facilities.

Bethlehem makes high-quality alloy steels in a complete range, including all AISI grades and special analyses for every purpose.

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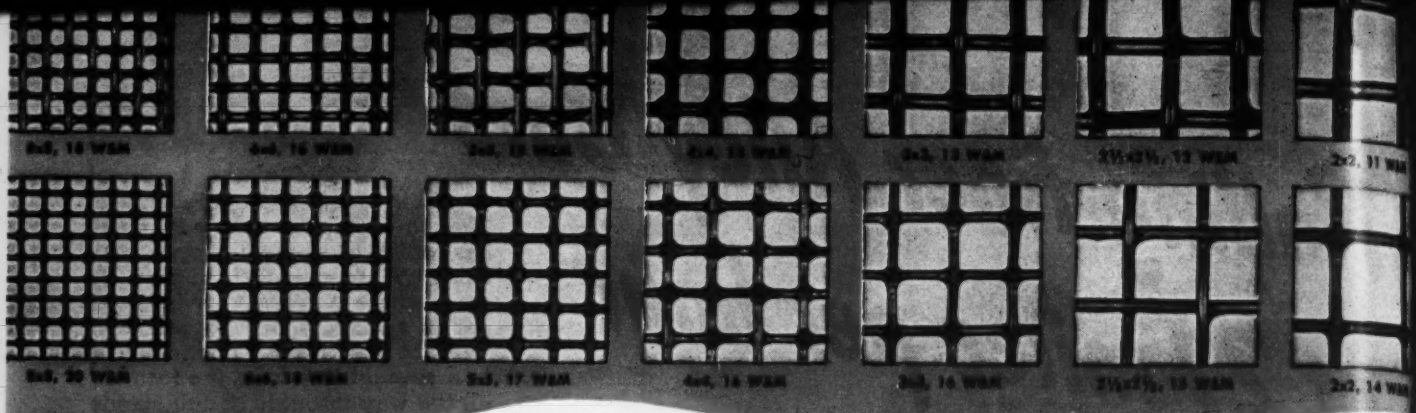
BETHLEHEM STEEL



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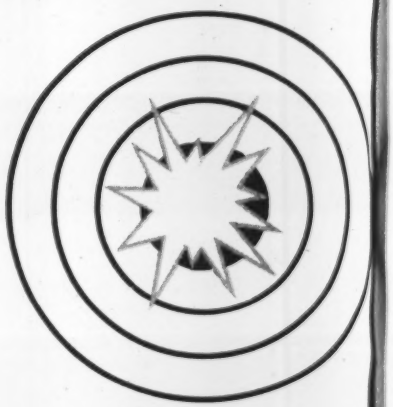
A typical production-profit boost by BW



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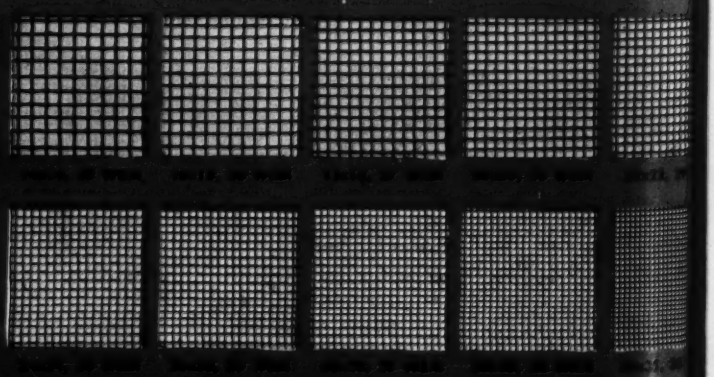

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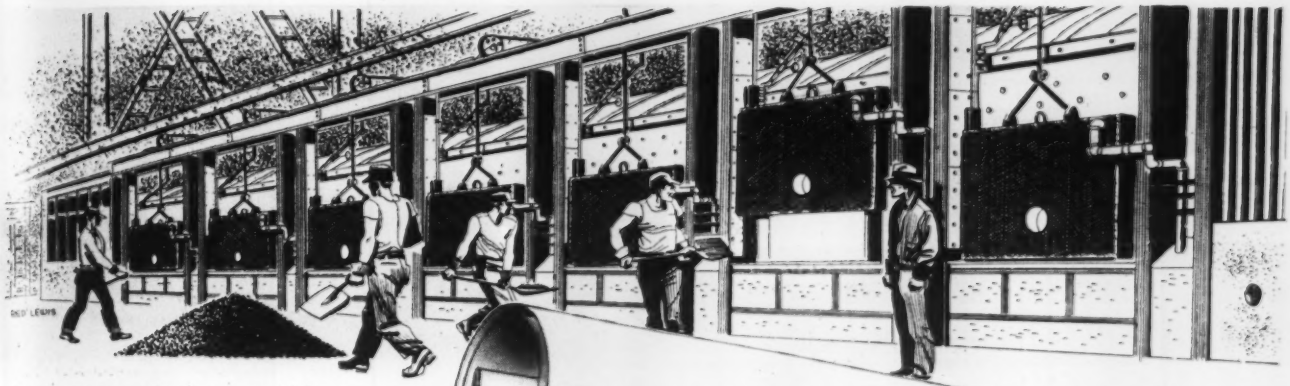
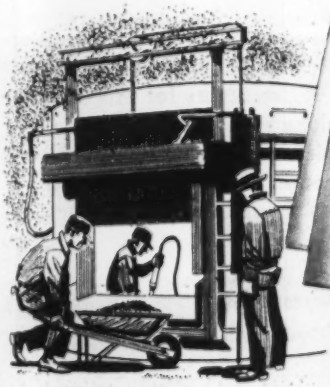


Slagging the Ramset hearth in the world's largest open hearth furnace, prior to charging.

Ramming a Ramset hearth. Use of forms establishes contour of banks.



New Ramset bottom being installed in basic electric furnace.

Repairing backwall and skewback with Gunchrome, air-emplaced through the BRI Gun.

An Unwritten Contract

4. A SALES STAFF WITH A BACKGROUND OF PRACTICAL STEELMAKING

As an initial consideration for your patronage we are equipped to furnish against the delivery schedule you establish, your requirements of refractory products, competitive in quality and price.

To earn an increasing participation in your refractory purchases we add to these basic considerations a sales staff that has a practical steelmaking background. Thus, the Basic Refractories' man who serves you combines a sound knowledge of refractories with a furnaceman's understanding of steel plant problems.

Backed by this experience, the Basic Refractories' sales staff has worked closely with the steel industry. For example, they shared in pioneering methods for installing Ramset hearths. They have helped to establish the benefits of the air-emplaced refractories, Gundol and Gunchrome. With the steelmaker, they are constantly striving to develop practices for better utilizing the time-saving refractories, Magnefer, Syndolag and Basifrit.

It is the responsibility of our men to assist your efforts to increase production and lower costs through the use of the right refractory in the best way. Their continuing discharge of this responsibility warrants your consideration of this company as a major supplier of your granular basic refractory requirements.

BASIC FURNACE REFRACTORIES

Basic Refractories Inc., 845 Hanna Building, Cleveland

Big Taconite Program Started in Minnesota
IRON ORE—A Global Outlook
April 17, 1950
U. S., Reds: Ore Resource Rival
They are the only two nations with adequate reserve
FUTURE ORE SUPPLIES

ORE BENEFICIATION

Through A-C Equipment and Engineering

FOREIGN ORE DISCOVERIES ARE GOOD NEWS, but domestic mines still will supply the bulk of the ore consumed in the U. S. Problems of transportation and availability will assure this. *One thing certain* in this changing picture, more mining, processing and handling will be required on domestic ores as quality lowers.

In iron mines throughout U. S., Allis-Chalmers equipment for half a century has been processing ores for the steel industry. Its research, engineering and experience is today helping ore producers meet the challenge of economical beneficiation of leaner ores and taconites.

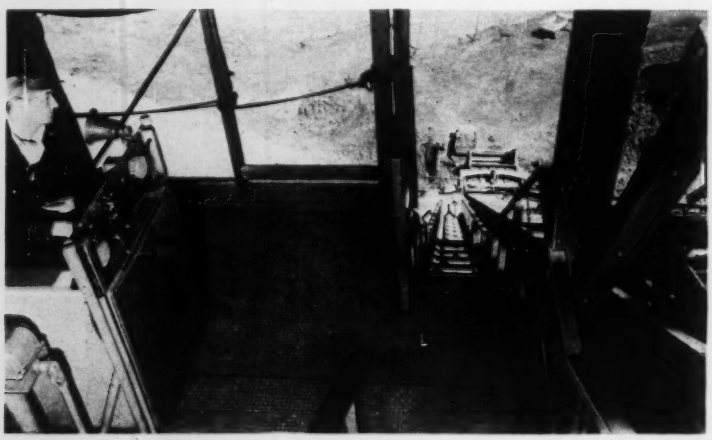
Operation photos, below and right, show A-C ore beneficiation equipment now in wide use. Allis-Chalmers offers you this kind of *undivided responsibility* for process, drive and control equipment all along your flow sheet.

A-C also operates a complete commercial research laboratory and pilot plant to aid you in developing new processes. For detailed information on equipment and services, call your nearest A-C office.

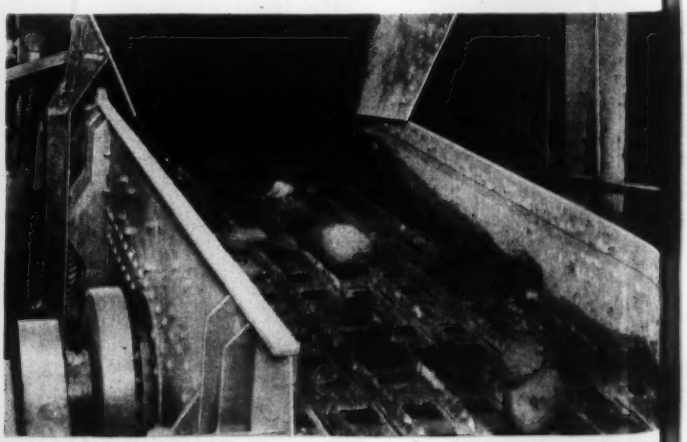
A-3095

ALLIS-CHALMERS, 1021A SO. 70 ST.
MILWAUKEE, WIS.

Texrope, Hydrocone and *Low-Head* are Allis-Chalmers trademarks.

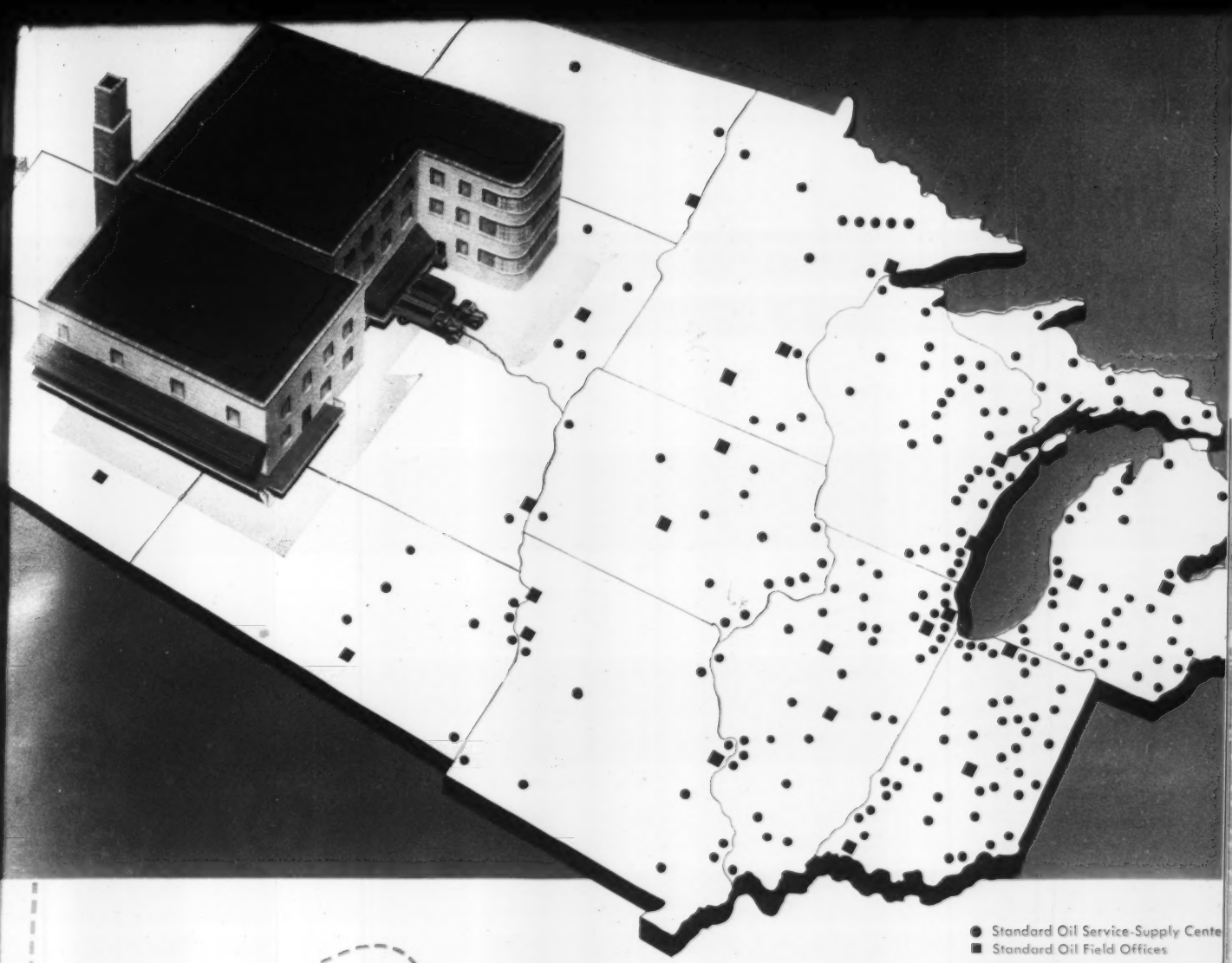


1 SINCE UP TO THREE TONS of ore are needed to produce one ton of concentrate, large quantities of low grade ore must be removed from the deepening mines. Mesabi range mine skip hoist above is A-C, built by the *only* manufacturer of hoists and *all* auxiliaries.



2 FINES ARE OFTEN SCALPED from run-of-mine ore on sturdy 1000 tph Style C vibrating screens like this one at a Minnesota iron mine. Allis-Chalmers builds *six* separate types of vibrating screens to meet varying beneficiation requirements.

UNIVERSITY OF MICHIGAN LIBRARIES



Right in your own back yard!

● If your plant is in the Midwest, you can benefit from a service-distribution set-up that is unique in the oil industry—there's a Standard Oil office and warehouse practically right in your own back yard. The nearness of that service-supply center holds important advantages for you.

Faster Deliveries. You needn't worry about production delays caused by late shipments of necessary lubricants and fuels. You can avoid the expense and trouble of stocking large quantities of lubricants and fuels within your plant.

A Complete Supply. Every lubricant and fuel necessary to the efficient operation of your plant will be carried in the warehouse at your nearby Standard Oil service-supply center. You can always get the product you need *when* you need it.

On-the-Spot Engineering Service. Your nearby Standard Oil service-supply center is headquarters for a Standard Oil Lubrication Specialist who is assigned to your plant. He is close at hand to give you help when you need it. He has plenty of practical experience. He has been specially trained for his job in a Standard Oil Lubrication Engineering School. He is backed by Standard Oil's extensive research and technical facilities.

To arrange for his visit, phone your nearby Standard Oil service-supply center or write to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

3 IMPORTANT ADVANTAGES

Standard Oil's Lubrication Service is especially geared to serve your midwest operations.

1 Service-supply points are near your plant. You are assured of fast deliveries, prompt lubrication engineering service.

2 Lubrication specialists have been specifically trained in Standard Oil Lubrication Engineering Schools to help you obtain the maximum benefits from lubricants and fuels.

3 Research and technical facilities are geared to help solve your specific lubrication problems.

STANDARD OIL COMPANY (INDIANA)

STANDARD

What's YOUR problem?

R. L. Jenkins, lubricating specialist at Standard Oil's South Bend office solved this customer's problem because he was thoroughly familiar with job requirements and the application of his Stanorust line.

There is a corps of such lubricating specialists throughout the Midwest, trained and experienced to help plant operators solve similar problems. Experience enables these men to find quickly the cause of lubricating troubles. Knowledge of petroleum products enables them to prescribe the lubricant needed. There is one of these lubricating specialists at the Standard Oil Company (Indiana) office near you. He is there to serve you. A call or a card will put him at your service.

Investigate the cost-saving possibilities of these lubricants.

STANOIL INDUSTRIAL OILS—for cleaner hydraulic systems, gear cases, compressors, and circulating systems.

CALUMET VISCOUS LUBRICANTS—adhere to open gears and chain drives without throw-off. Easy to apply. No heating.

STANOLITH GREASE—withstands high temperatures and resists washing by water.

THE SHOP FOREMAN of Hart Pressed Steel Corp., Elkhart, Indiana, exposes the clean metal surface beneath a coating of STANORUST 1-XC Rust Preventive by a simple wiping operation. The die shown has been protected against rust under severe outdoor conditions for over a year by STANORUST 1-XC.

How to prevent rust under severe outdoor storage . . .

RAIN, snow, heat, cold—plus coal soot from passing locomotives—could be expected to produce serious rust troubles in outside storage. The elements did, indeed, cause difficulties for the Hart Pressed Steel Corp., Elkhart, Indiana, which owns the truck and trailer dies shown above. Despite coatings of heavy oil, rusting was so severe that cleaning a die required at least three hours.

The problem was laid before a Standard Oil lubrication specialist. He pointed out that, to withstand severe outdoor exposure, a rust preventive with special qualities is needed. At his suggestion, the dies were coated with STANORUST 1-XC, a rust preventive especially developed for severe outdoor service.

Use of a STANORUST Rust Preventive has made savings for this company. Many of the dies have been exposed to the weather for over a year, yet STANORUST has kept them completely protected against rust. A die can now be cleaned and returned to service in a matter of ten minutes, as compared with the three hours previously required.

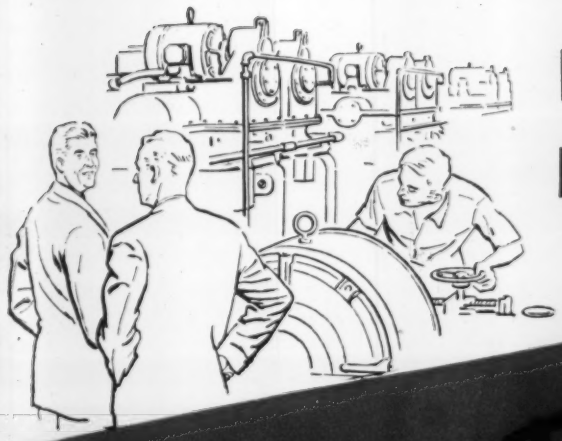
The new and improved STANORUSTS can mean big savings for you through more economical applications, better rust protection. There's a lubrication specialist near you who can help you get the most economical results. How you can obtain his services is described at left. Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANORUST
REG. U S PAT. OFF.
RUST PREVENTIVES

STANDARD OIL COMPANY (INDIANA)

STANDARD

UNIVERSITY OF MICHIGAN LIBRARIES



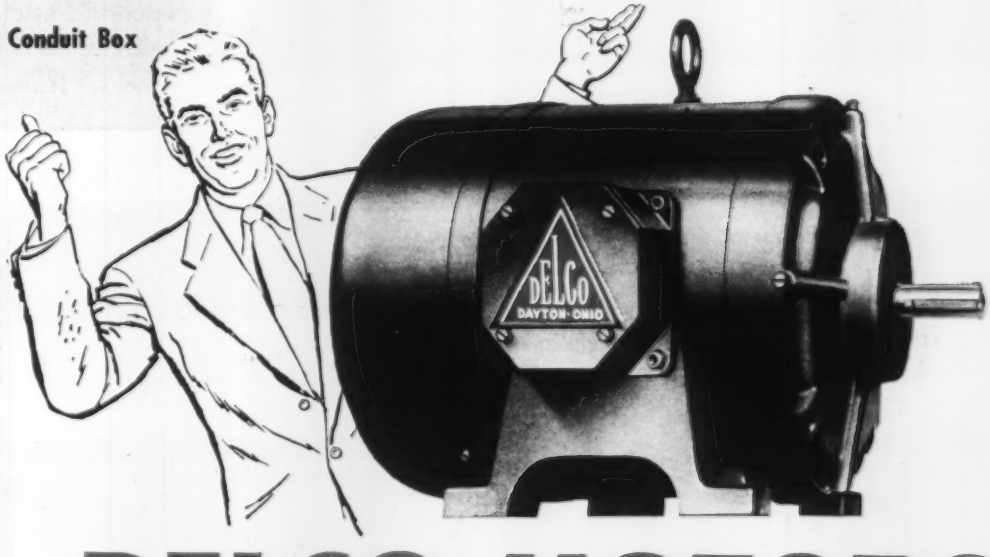
No wonder production men say . . .

"Delco Preferred!"

There's no better way to assure peak motor performance

- **Positioned Bearings**
- **Delcote Coil Insulation**
- **Corrosive-Resistant Cast Iron Frame**
- **Positive Lubrication**
- **Dynamically-Balanced Rotor and Shaft Assembly**
- **Water-Tight Conduit Box**

"Delco Preferred" . . . It's the engineers' and production men's way of saying, "On this job we want a fine quality motor that's sturdy, rugged, dependable . . . that outperforms all the rest!" Yes, when production men want to reduce motor maintenance and eliminate down time, they specify Delco—the only motor with all the *performance extras* listed at the left.



If you want to get all the facts on Delco Motors, call or write Delco Products, Dayton, Ohio . . . or contact any of the sales offices listed below.

DELCO DAYTON OHIO

DELCO MOTORS

DELCO PRODUCTS, DIVISION OF GENERAL MOTORS CORPORATION, DAYTON, OHIO

SALES OFFICES: CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HARTFORD, CONN.

On the watch for wobble

There's a world of difference between *still*-fit and *operating*-fit in a ball bearing, especially at higher R.P.M.'s Holding "wobble" or run-out to a minimum is the problem in order to maintain proper running clearances. Here's a true measure of Federal Ball Bearing precision in manufacture and operation both . . . and another vital inspection stop along the Federal production line.

To prevent run-out, inner and outer races of *every* Federal Bearing are ground concentric with bore and O.D. Bores are cylindrical, not tapered or bellmouthed. and sides of the rings held parallel to each other and the ball track. Proper operating fit at high speeds is the result, with correct running clearances maintained between housing and shaft.

Taking the "measure" of a bearing to Federal's rigid standards involves over 100 individual production, inspection and cleaning operations—*with every fourth operator an inspector.* Out of this system of check and re-check, fifty years in the developing, Federal Bearings are equipped to deliver friction-free performance on any assignment.

Your application may benefit from a Federal Ball Bearing installation. Write today for our 260 page catalog "K." It describes the complete line of Federal Ball Bearings.

THE FEDERAL BEARINGS CO., INC. · POUGHKEEPSIE, NEW YORK

Makers of Fine Ball Bearings

Quality since 1908

FEDERAL BALL BEARINGS

ONE OF AMERICA'S LEADING BALL BEARING MANUFACTURERS

Wean-Hallden

LOW COST SYNCHRONIZED AUTOMATIC SHEAR LINES

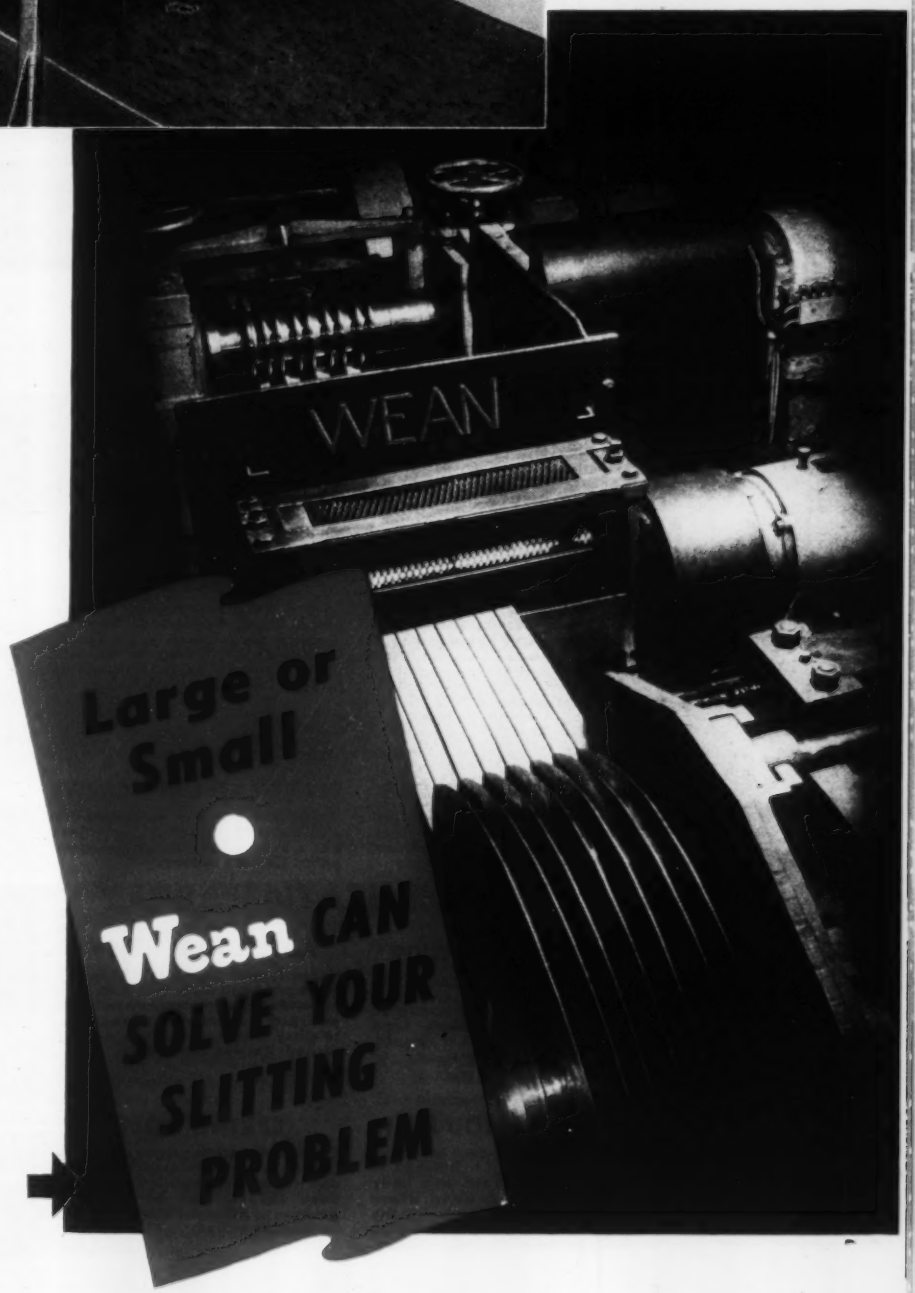
THE installation of a Wean-Hallden Synchronized Automatic Shear Line assures you the most efficient shearing operation available today. The Wean-Hallden, while actually requiring *less floor space*, delivers up to *twice the production.*

Infinite variable lengths from 12-inches to 12-feet at speeds up to 200 FPM with accuracy better than commercial tolerances means faster production, reduced labor costs and minimum scrap loss for you. *Before You Buy—Investigate Wean-Hallden.*

If you are in the business of handling strip steel or fabricating steel parts or products from strip steel you should give your slitting operation high consideration.

Well designed slitting lines enable you to reduce inventories, lower labor costs and eliminate expensive extras. Wean engineered slitting lines give you these important factors at lowest initial costs.

If you have a slitting problem — or merely desire a check on the efficiency of your present operation — call in Wean specialists.



Wean *Equipment Corporation*

CLEVELAND, OHIO

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.

2159 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

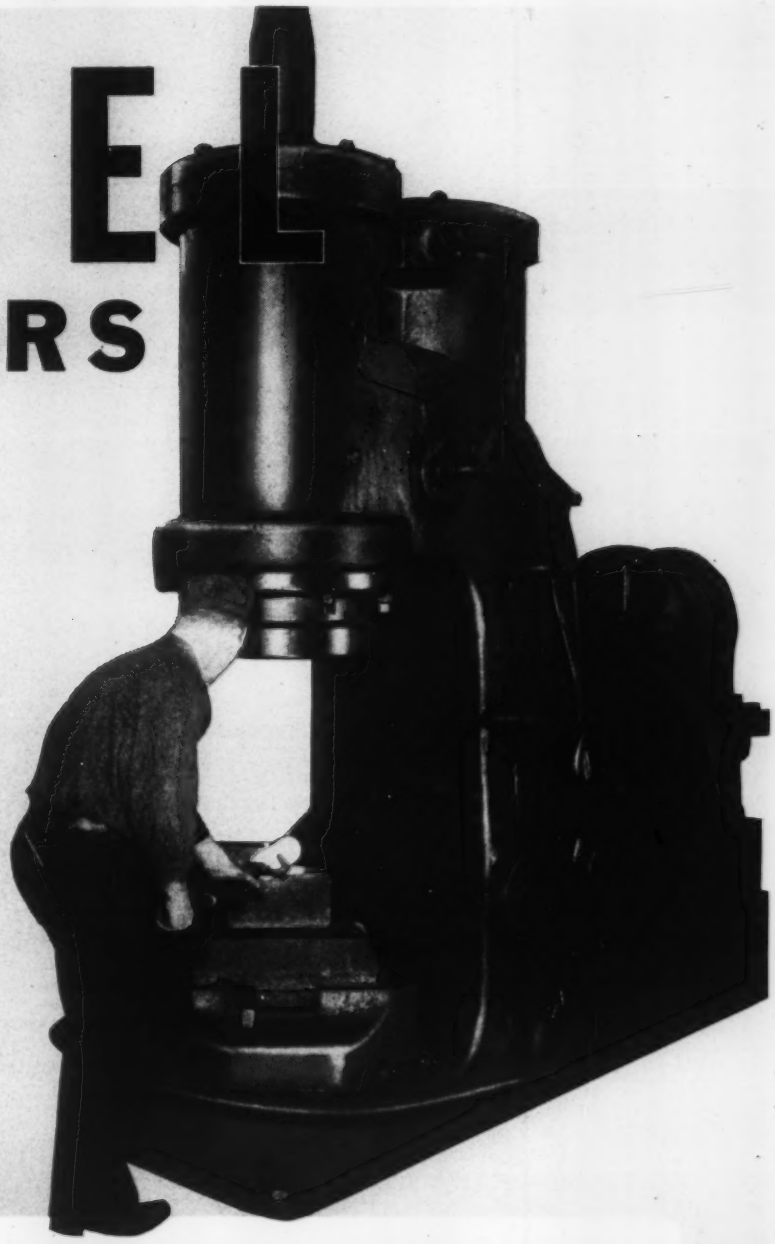
STANDARDS carried by LEADING DISTRIBUTORS

* SPECIALS furnished to BLUE PRINT SPECIFICATIONS

WRITE FOR INFORMATION

SEND FOR SAMPLES

NAZEL HAMMERS



Require only *one man* to handle.

Self-contained—require no compressor, boiler, accumulator or piping.

Consume power only when in operation.

Heavy, rigid, durable construction that assures long, trouble-free life.

Efficient—fewer reheats, less labor, lower costs.

Better hammer service in your neighborhood.

The most widely used air-actuated, motor-driven hammers in the world.

THERE IS A NAZEL REPRESENTATIVE NEAR YOU

Carey Machinery & Supply Co., Inc.
Baltimore 3, Maryland
& Washington, D.C.

The Young and Vann Supply Company
Birmingham 2, Alabama

Rudel Machinery Company
Boston, Massachusetts

Noland Company, Inc.
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Neff Kohlbusch & Bissell
Chicago 12, Illinois & Milwaukee, Wisconsin

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Cincinnati 2, Columbus,
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George D. Miller Company
Cleveland 13, Ohio

Wessendorff, Nelms & Company
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The Mine and Smelter Supply Co.
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The Charles A. Strelinger Company
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Fuchs Machinery & Supply Company
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Voss Machinery Company
Pittsburgh, Pennsylvania

Blackman and Nuetzel Machinery Co.
St. Louis, Missouri; Tulsa, Okla.
& Memphis, Tenn.

Harron, Rickard & McCone Company of
Northern California
San Francisco, California

Star Machinery Company
Seattle, Washington; Portland,
Oregon, & Spokane, Washington

Syracuse Supply Company
Syracuse, New York; Rochester,
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Dixie Mill Supply Company, Inc.
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Louisiana

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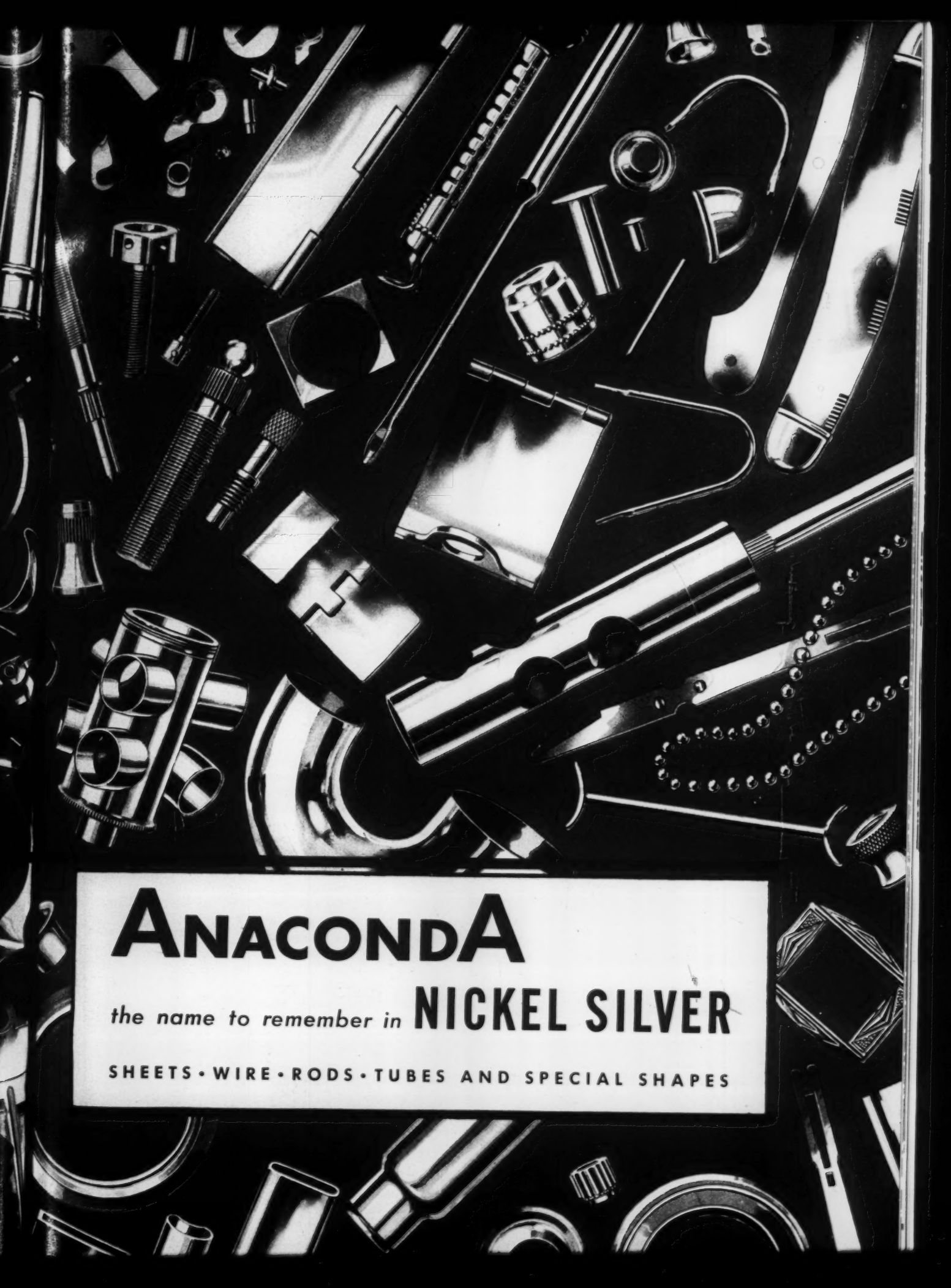
LOBDELL UNITED COMPANY
A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY
1836 WILMINGTON 99, DELAWARE 1950

NICKEL SILVER is beautiful in color—clear through—ranging from a soft ivory white in the low-nickel alloys, to a brilliant silvery white in alloys upwards of 18% nickel. It has higher strength and greater resistance to general corrosion than brasses containing an equal amount of copper.

It's a highly malleable and ductile metal, too . . . readily drawn, stamped, formed, spun, swaged, upset, forged, extruded, machined, soldered, brazed or welded.

Its durability, beautiful luster, ease of fabrication and moderate price, account for its broad acceptance in so many fields—both decorative and utilitarian.

Each year, millions of pounds of Anaconda Nickel Silver are produced by The American Brass Company —in all commercial forms—in all standard compositions, finishes and tempers. We'll be glad to recommend the alloy best suited to meet the individual requirements of your products. Address the General Offices, Waterbury 20, Connecticut. In Canada, New Toronto, Ontario. 8098


ANACONDA
the name to remember in NICKEL SILVER
SHEETS • WIRE • RODS • TUBES AND SPECIAL SHAPES

WHERE YOU SEE *this*... YOU SEE

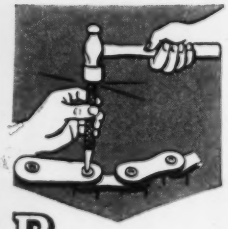
Longer Chain Life, Lower Chain Cost, Easy Adjustment, Faster Service!

This distinctive link marks the new "BA" . . . Baldwin Assembly . . . riveted roller chain. And it's the mark of long, low-cost service.

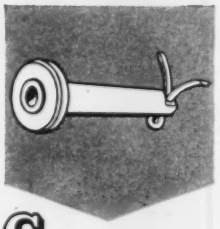
The new "BA" assembly roller chain gives you all the advantages of riveted roller chain . . . longer life . . . even greater ease of field assembly and disassembly than with old style detachable roller chains . . . and in single strand, lower cost.

HERE'S HOW SIMPLE IT IS TO TAKE APART *THIS* ROLLER CHAIN!

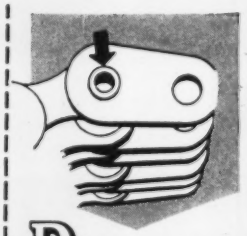
A The single pin connector is the heart of the "BA" assembly and is readily identified by its distinctive shape. One pin in this link has a cotter on one end; the other end is spun over a washer. The other pin is fully riveted to the adjacent link, thus assuring the assembly of the superior life of riveted chain.



B To take the chain apart, simply remove the cotter on the single pin connector link and drive out the pin. Pin is a slip fit through the chain except for a milled flat on the cottered end which is fitted into a special hole in the connector plate. There is no danger of destroying fits or damaging parts with this chain.



C The single pin connector of the "BA" assembly fits snugly into place . . . even though it is a slip fit through virtually the entire link. The washer spun over one end of the pin and the milled flat on the cottered end that is fitted into the special hole in the connector plate, plus the cotter, hold the pin firmly in place.



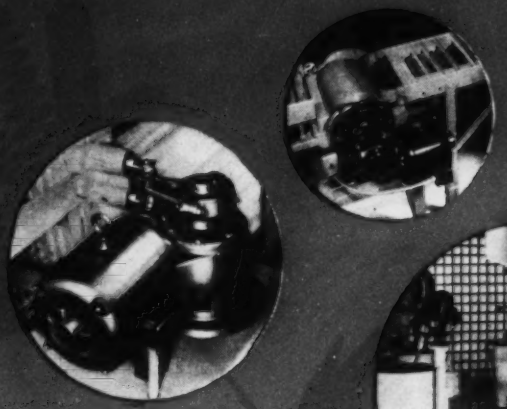
D An important advantage to you is the fact that the other end of the single pin connector link is firmly riveted to the adjacent link. When the single pin connector is removed, this riveted pin holds the chain parts together, thus keeping plates in line and preventing them from falling out, simplifying assembly.

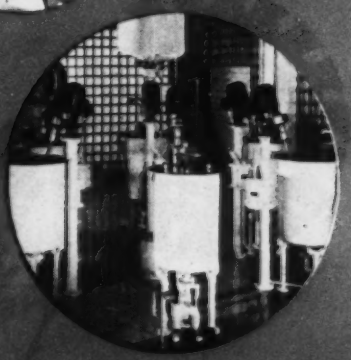
For all the facts on "BA" assembly, write Chain Belt Company, Baldwin-Duckworth Division, 326 Plainfield St. Springfield 2, Mass., and ask for Bulletin 50-6.

BALDWIN·REX

ROLLER CHAINS

a complete line from ¼-inch to 2½-inch pitch





On big jobs or little ones it pays to take advantage of Master's unusual ability to supply the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

little ones or **BIG** ones

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

EVER SEE A

Spring Plant?

Drop around sometime at any of the plants in the group below for a sample of the methods that have produced some of the finest spring crops in existence. Early cultivation awaits your word.

U. S. DIVISIONS OF ASSOCIATED SPRING CORPORATION AND CANADIAN AFFILIATE

WALLACE BARNES COMPANY
BRISTOL, CONNECTICUT

THE WILLIAM D. GIBSON COMPANY
1800 CLYBOURN AVE.
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BARNES - GIBSON - RAYMOND
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THE BEST SEVEN SOURCES FOR MECHANICAL SPRINGS

DUNBAR BROTHERS COMPANY
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1712 EAST FIRST ST.
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THE WALLACE BARNES COMPANY LTD.
HAMILTON, ONT. CANADA

UNIVERSITY OF MICHIGAN LIBRARIES

1850

The year 1950 marks
the One Hundredth Anniversary of

THE CLEVELAND-CLIFFS
IRON COMPANY

In entering the Second Century of our operations on the iron ore ranges in the Lake Superior District, we wish to express our deep appreciation to our employees, our customers and our shareholders for their contribution to the development of Cleveland-Cliffs during the years since the pioneering days of this company in the Iron Ore Industry.

THE CLEVELAND-CLIFFS IRON COMPANY
CLEVELAND, OHIO

1950

Give New Life to Worn Parts

. . . *Rebuild Them by UNIONMELT Welding*

This automatic process saves time and money—welding is fast—parts are returned to service quickly—new surface is often superior to original--

Almost any part that can be suitably positioned can be rebuilt by UNIONMELT welding. It has been used successfully on parts such as steel mill rolls, guides, mandrels, journals; wheels for locomotives, cars, and cranes; pipe molds, and press plungers and cylinders.

Deposits of almost any thickness can be made of—

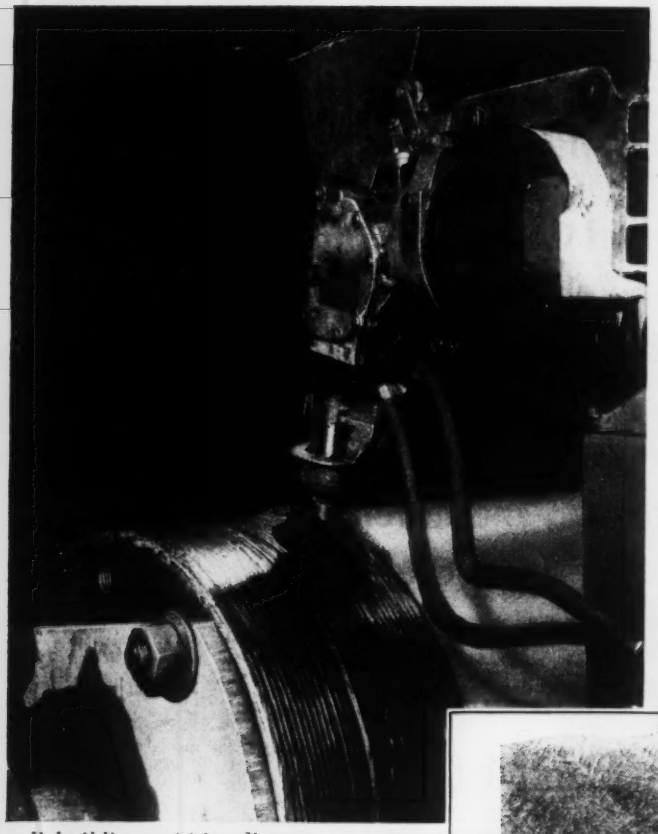
High carbon, flame-hardenable steels

Wear-resistant and hard-facing materials

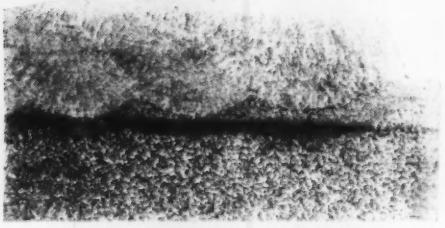
Corrosion- and heat-resistant steels

With UNIONMELT electric welding, clean, dense, uniform weld metal can be deposited at the highest known welding speeds. There is no glare, flash, or spatter during welding. If a finished surface is needed, only minimum machining is required because of the smoothness of the weld deposit.

There are many LINDE methods of joining, rebuilding, forming, cutting and treating metals. LINDE Engineering Service can help you in production, construction, and maintenance. Just call the nearest LINDE office.



Rebuilding a 24 in. diameter press plunger.



A flat surface is produced by offsetting each bead.

Linde
Trade-Mark

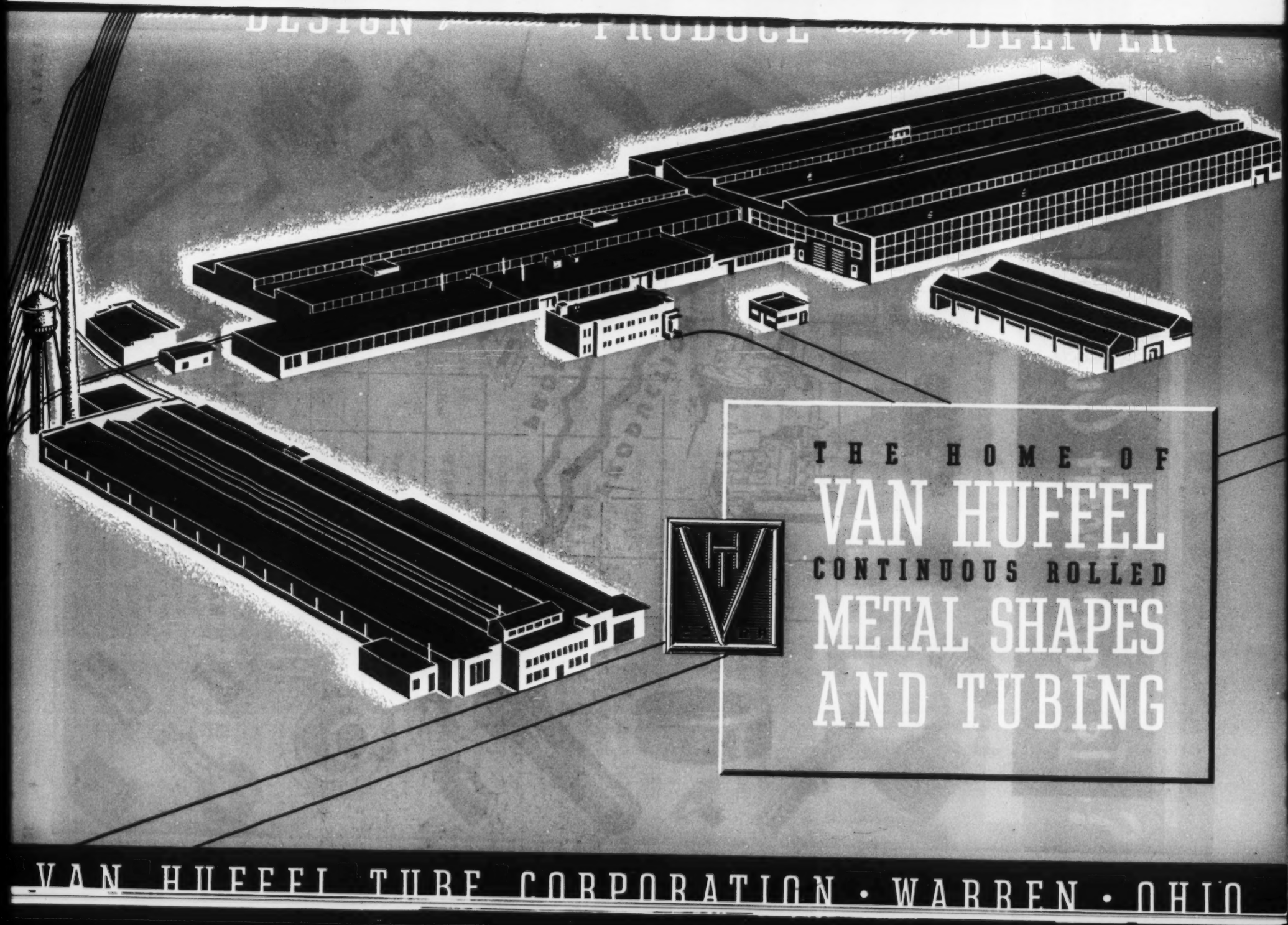
THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

General Office: New York, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The words "Linde," and "Unionmelt" are registered trade-marks of The Linde Air Products Company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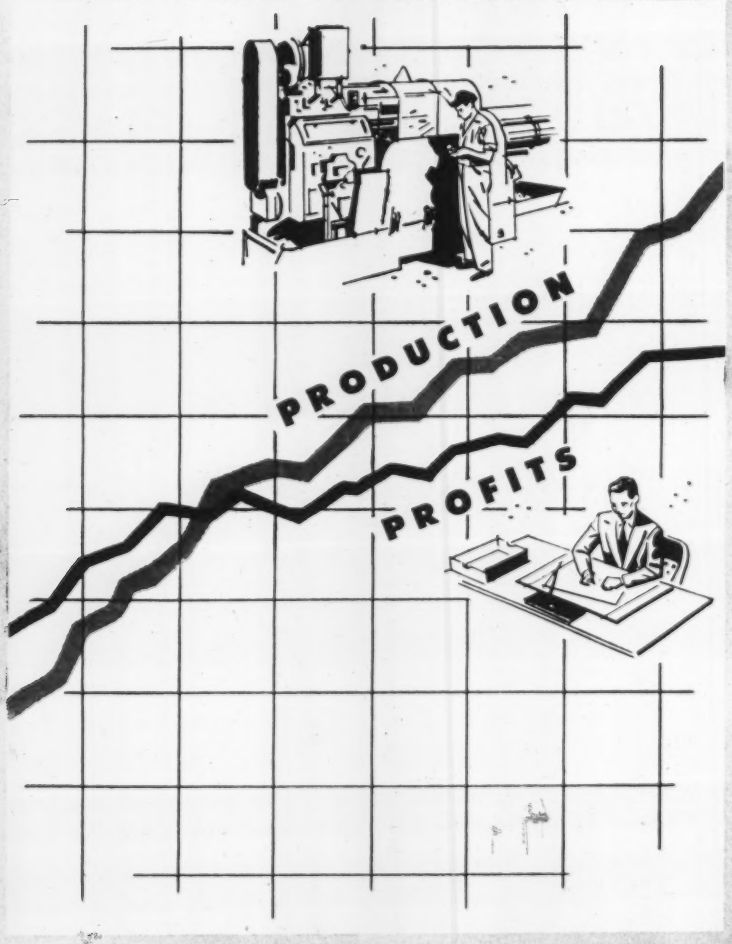
Is your Profit Curve lagging



THIS NEW STEEL
MAY HELP YOUR PROFIT CURVE, TOO!

Are your equipment and parts such that you can use higher speeds and longer tool life? Then it will pay you to investigate Union Drawn's new Bessemer Screw Steel —B-1113-X. A Union Drawn Metallurgist will be glad to tell you all about it.

behind your Production Curve?

. . . maybe it needs this improved

MACHINABILITY

● It sometimes happens! A robust parts production curve climbs steadily . . . but in spite of every remedy at hand, the profit curve develops anemia —just doesn't have the stuff to make the grade.

Is *your* profit curve as healthy as it might be? Maybe *it* needs the same "shot in the arm" that has helped other parts producers—the kind of MACHINABILITY that has made Republic Union Cold Drawn Steels famous.

Yes, famous—and for very good reasons! At Union Drawn the first and foremost aim of metallurgists and engineers always has been MACHINABILITY—*uniform* MACHINABILITY.

Little wonder, then, that these men know so much about this vital factor in the mass production of steel parts . . . and how to produce steel bars that cut equally well whether shipped today, next week or next year.

If you've never used Republic Union Cold Drawn Steels, here's what you can expect: 1. Uniformity throughout bar after bar and shipment after shipment. 2. A remarkable freedom from tool-wearing abrasive elements. 3. Smooth, bright machined surfaces. 4. Top production efficiency. 5. Low unit costs. All of which stimulate the profit curve.

Now—how to apply all this to your own operations to get the most out of it? Just ask us to put Republic metallurgists and engineers to work for you. It's their job to see that you use the right steel in the right way—to help you get that profit curve back up where it belongs. Call your nearest Republic District Sales Office—or write us.

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Union Drawn Steel Division • Massillon, Ohio
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Union Cold Drawn Special Sections
•
Union Cold Drawn and Ground Rounds; Turned and Polished Rounds; and Turned, Ground and Polished Rounds (Union Precision Shafting.)

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When you need extraordinary steel service, Crucible Warehouse Service can't be beat. If you're out of stock, don't need a mill-sized shipment, or can't wait for a mill shipment, check with Crucible. 23 warehouses and pools . . . completely stocked . . . are maintained by Crucible to meet your requirements. Crucible's immediate delivery can help you meet tight production schedules.

Make Crucible your warehouse. Come in to the Crucible warehouse near you and see first hand how well prepared we are to serve you . . . and how complete our stocks are. To help you even more, Crucible's alert metallurgical staff is freely available to you for your specialty steel application. Take full advantage of Crucible's stocks and service. CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

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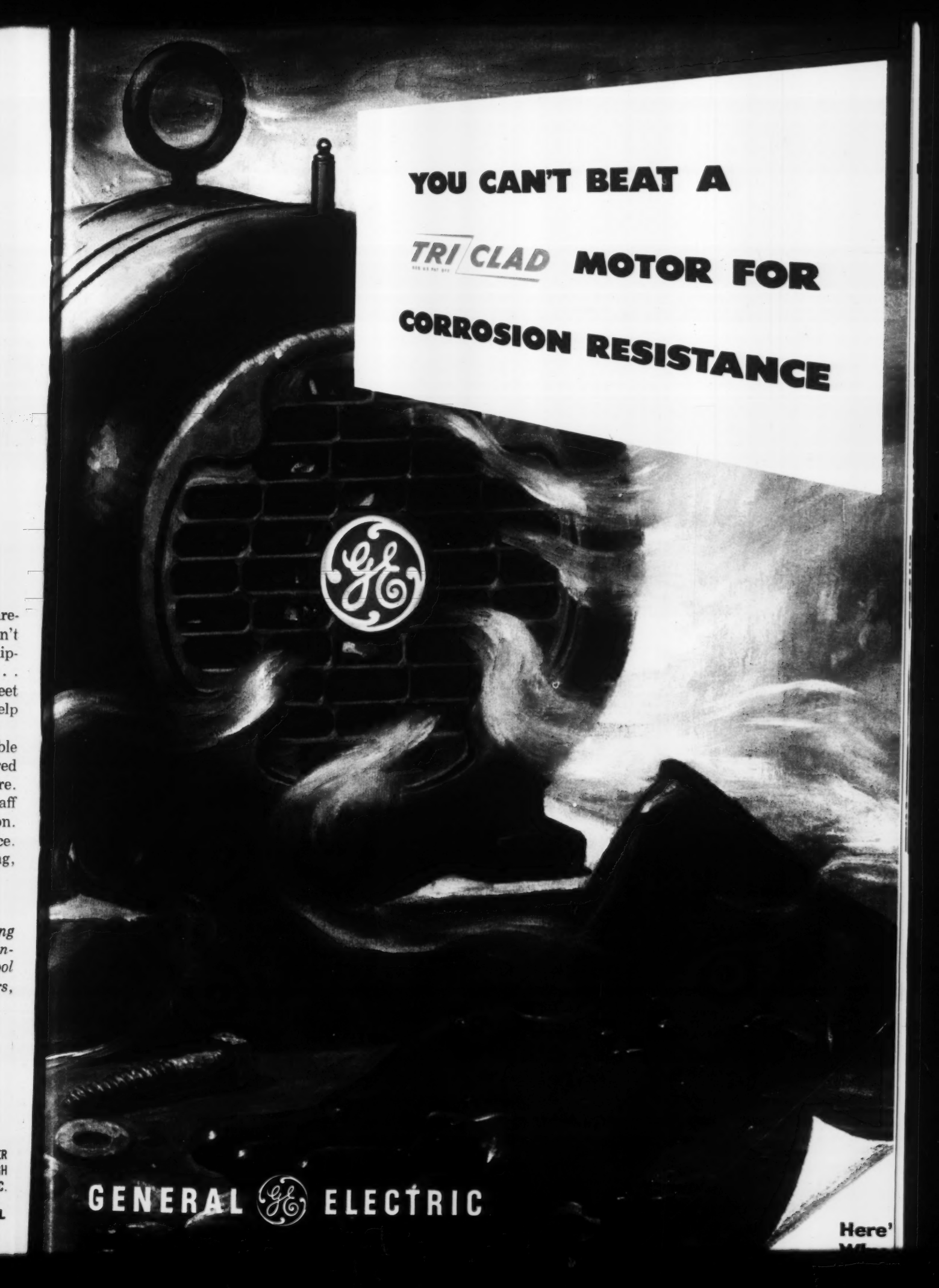
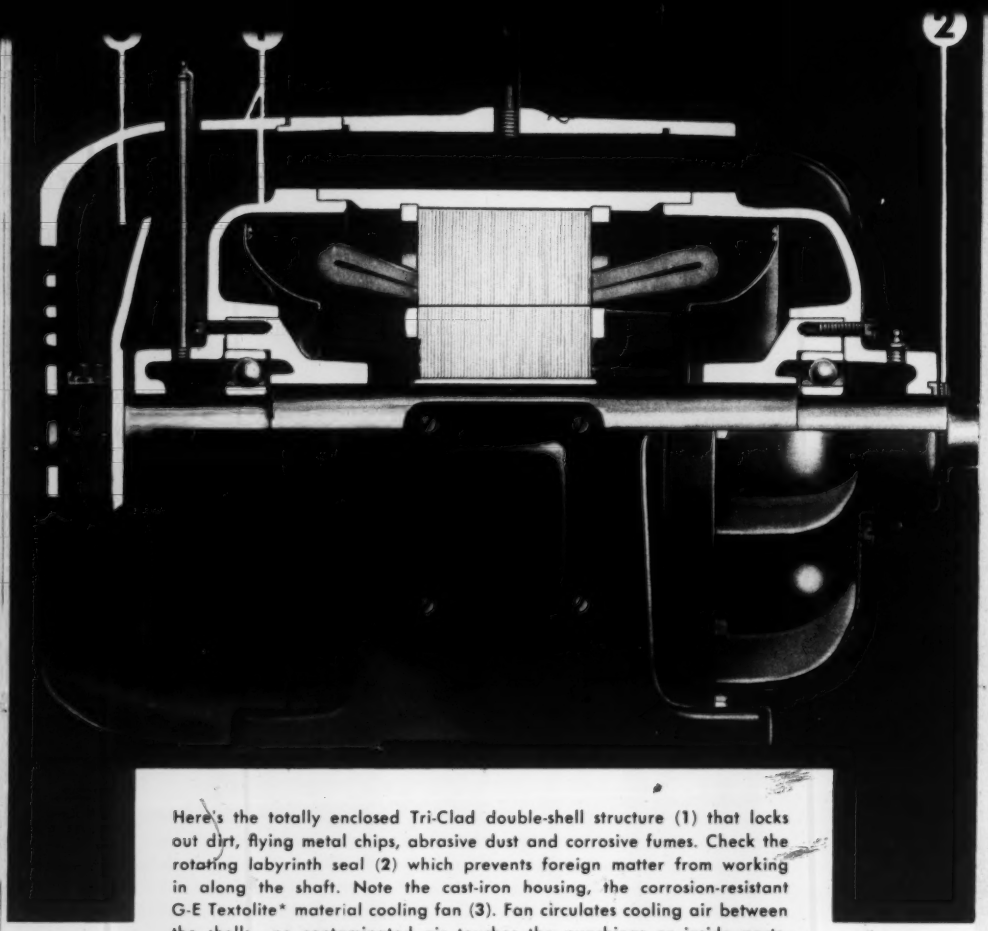

YOU CAN'T BEAT A
TRI CLAD MOTOR FOR
CORROSION RESISTANCE
GENERAL ELECTRIC
Here'



Here's the totally enclosed Tri-Clad double-shell structure (1) that locks out dirt, flying metal chips, abrasive dust and corrosive fumes. Check the rotating labyrinth seal (2) which prevents foreign matter from working in along the shaft. Note the cast-iron housing, the corrosion-resistant G-E Textolite* material cooling fan (3). Fan circulates cooling air between the shells—no contaminated air touches the punchings or inside parts.

You can't beat TRI CLAD motors for corrosion resistance

REG. U.S. PAT. OFF.

Acid fumes, alkali dust, dye-house vapors, tropical weather – you name *your* motor "poison." You just can't beat Tri-Clad cast-iron construction for corrosion resistance.

Rolling up 6 billion hours of service on all kinds of jobs, more than 1,876,000 Tri-Clad motors tell the eye-opening story of cast-iron motor structure. You get an inherent damping action that minimizes noise and damaging vibration. You get rigidity that makes for permanent shaft alignment. (Try bolting a Tri-Clad motor to an uneven surface – the bolt will snap before you can twist the rigid frame out of line.) You get extra protection against jarring blows and rough handling. You get resistance to rust and corrosion that is not approached by any other metal used for standard motor construction today.

WANT MOTORS THAT STAY ON THE JOB ANWYHERE? There's a stock of Tri-Clad motors near you, in nearly all types and ratings, ready for **IMMEDIATE SHIPMENT**. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

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(standard on popular sizes)

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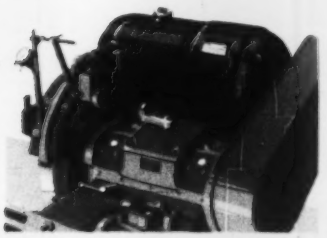
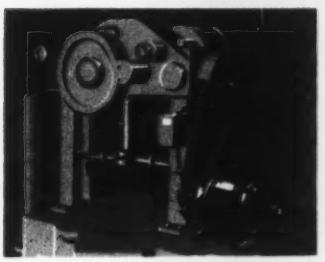
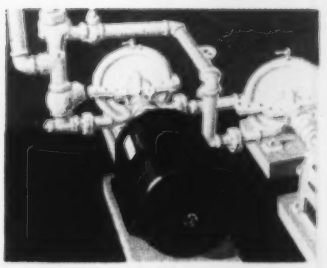
G-E capacitor motors for use on fans, blowers, pumps and compressors with single-phase power. From ¾ to 5 hp.



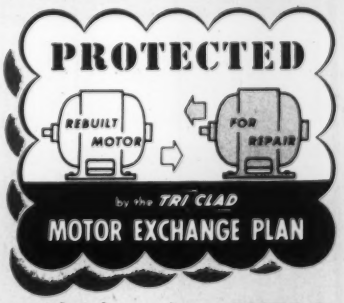
G-E Type ACA induction motors for adjustable speeds—provide speed ranges from 3-1 to 20-1. From 3 to 75 hp.



G-E open (dripproof) induction motors for constant-load, constant-speed applications. From 1 to 2000 hp.



G-E totally enclosed motors for outdoor operation, in abrasive dusts, or corrosive fumes. From 1 to 1000 hp.



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Protection plus

for rolling mill drives

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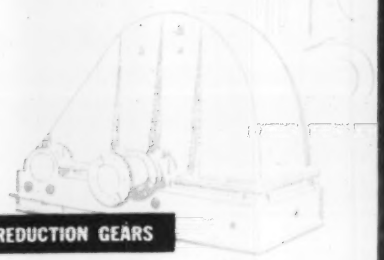
Gulf E.P. Lubricants



REDUCTION GEARS

TABLE DRIVES

SCREW DOWN GEARS

Gulf E. P. Lubricants are specially compounded to withstand the shock loads and high pressures encountered in the most severe service. Their extra load-carrying capacity is more than ample to protect any well designed gear—prevent excessive wear, keep maintenance costs low.

In addition to higher lubricating value, Gulf E. P. Lubricants have many other features that insure lower maintenance costs and freedom from lubrication troubles. They are exceptionally stable, in storage or in use; have unusually good water separating characteristics; contain a special corrosion inhibitor which protects against rust; and are nonfoaming and noncorrosive.

Gulf E. P. Lubricants are ideal for many steel mill applications, and are particularly recommended for pinion stands, reduction gears, and gear-driven table rollers.

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For more complete information on these outstanding gear lubricants or for expert help on the lubrication and maintenance of your gear drives, send the coupon below.

Play safe with Gulf E. P. Lubricants

- **High film strength—prevent metal to metal contact and excessive wear.**
- **Extremely stable—do not separate in use or in storage.**
- **Prevent rust — contain a special corrosion inhibitor.**
- **Have excellent water separating characteristics.**
- **Nonfoaming · noncorrosive.**

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Gentlemen:

☐ Please send me, without obligation, a copy of your pamphlet "Gulf E. P. Lubricants."

☐ Please have an experienced Gulf Lubrication Engineer call on us to discuss improved gear lubrication.

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Demonstrate Effective Utilization of *GAS* for High Temperature Processing

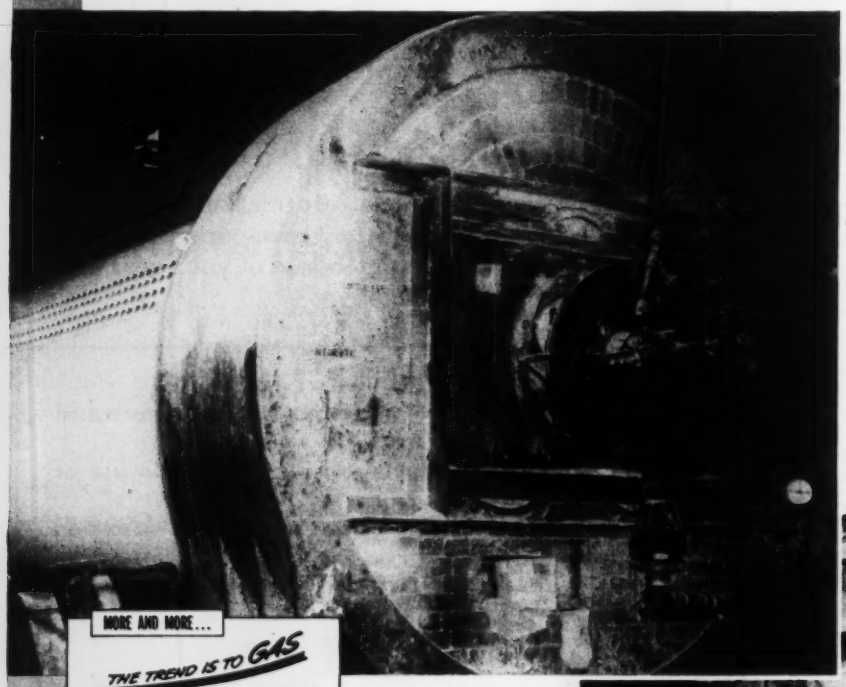
CALCINATION is one of the major heat processing operations at Aluminum Ore Company, East St. Louis, Illinois. In huge rotary kilns refined bauxite ores are converted into aluminas, and other chemical compounds by the direct heat method using GAS under precise automatic control.

Over a period of almost 20 years Aluminum Ore Company has used GAS for calcination because this versatile fuel provides the accurate temperatures so essential to the production of uniform materials.

Throughout this time the demands for chemicals derived from bauxite have grown in number and diversity. To meet these requirements the company has developed sixty or more chemicals in addition to its basic alumina.

Because it is capable of maintaining the uniform temperatures required for chemical processing GAS continues to serve Aluminum Ore Company—providing clean, automatically controlled heat at just the correct temperature.

Yet, these Alcoa applications represent just a small cross-section of the ways in which GAS can, and does, serve the chemical and metallurgical industries. Your Gas Company Representative will tell you more about them —call him today.



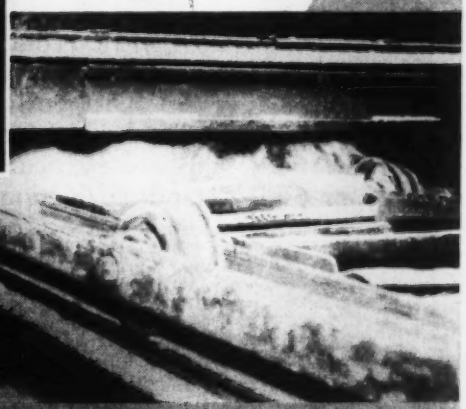
Firing end of one of the Gas-fired rotary kilns used for converting hydrates into pure alumina, special alumina ores, alumina compounds, et cetera. This kiln converts aluminum trihydrate into aluminum oxide.

ALCOA

A·C·O·A ALUMINUM

Registered U.S. Pat. Off.

ALUMINUM COMPANY OF AMERICA



White-hot aluminum oxide being discharged from kiln into conveyor.

MORE AND MORE... THE TREND IS TO GAS FOR ALL INDUSTRIAL HEATING

AMERICAN GAS ASSOCIATION

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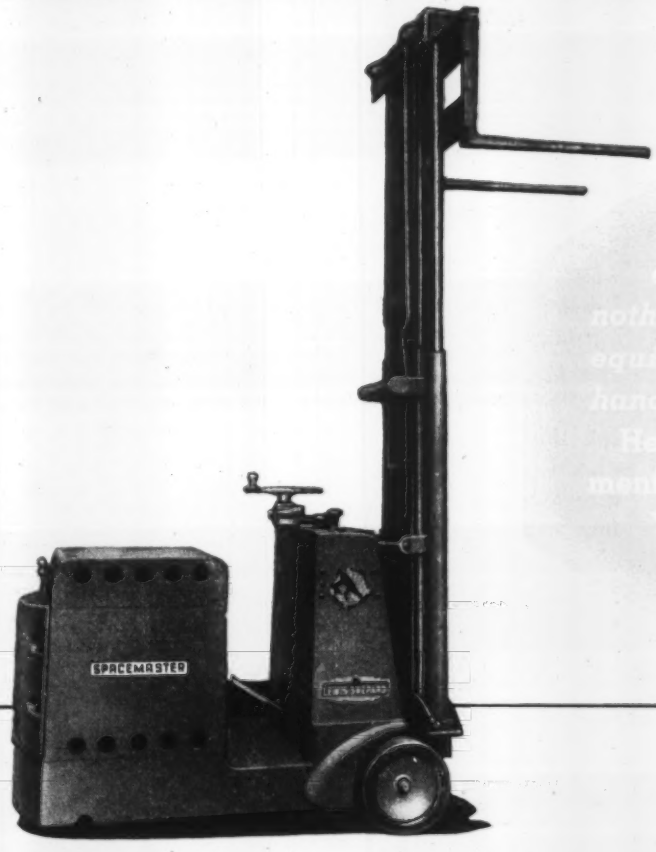
Your keenest competitor knows—



that no matter how well established his business may be, nothing can damage it more than better equipment and better methods in the hands of an aggressive rival!

He also knows that unless YOUR equipment and methods are up-to-the-minute, YOU cannot continue to sell YOUR products at competitive prices.

MULTIPLY MANPOWER · LEWIS-SHEPARD ·

THE MASTER LINE ®

Top-flight materials handling equipment—produced by top-flight, up-to-the-minute machine tools and methods! That's the formula for competitive efficiency at Lewis-Shepard Products, Inc., Watertown, Mass.—and the main reason this firm uses Jones & Lamson Turret Lathes for most of its turning.

Rugged, dependable SPACEMASTER Electric Fork Trucks, a representative Lewis-Shepard product, require the highest standards of quality machining on their various components. Rapid production turning of tough alloy steel drive shafts and wheels—of precision steering gear housings and shafts—is a real test of turret lathe economy.

Where the jobs are really tough—where the premiums are on speed, finish, concentricity and *REPETITIVE ACCURACY*—the biggest savings come from Jones & Lamson Turret Lathes!

Are you equipped to your best advantage? Get a free check-up on your present operations. Write to our PRODUCTION RESEARCH DEPARTMENT for this service.

Photos Courtesy Lewis-Shepard Products, Inc., Watertown, Massachusetts

Turret Lathes—Fay Automatic Lathes—Thread Grinders—Optical Comparators—Threading Dies

JONES & LAMSON
MACHINE COMPANY
Springfield, Vermont, U.S.A.

MACHINE TOOL CRAFTSMEN SINCE 1835

WILL THIS COAL FEED THE WRONG KIND OF FIRE?

THOSE giant coal piles that stand next to power plants present little fire hazard in themselves. But when industry feeds its coal into pulverizing machinery to make a faster-burning, more efficient fuel, then sends it through ducts connecting pulverizers to storage bins—the picture changes! The fine coal particles ignite easily, burn fiercely—and flames inside the duct are almost impossible to get at.

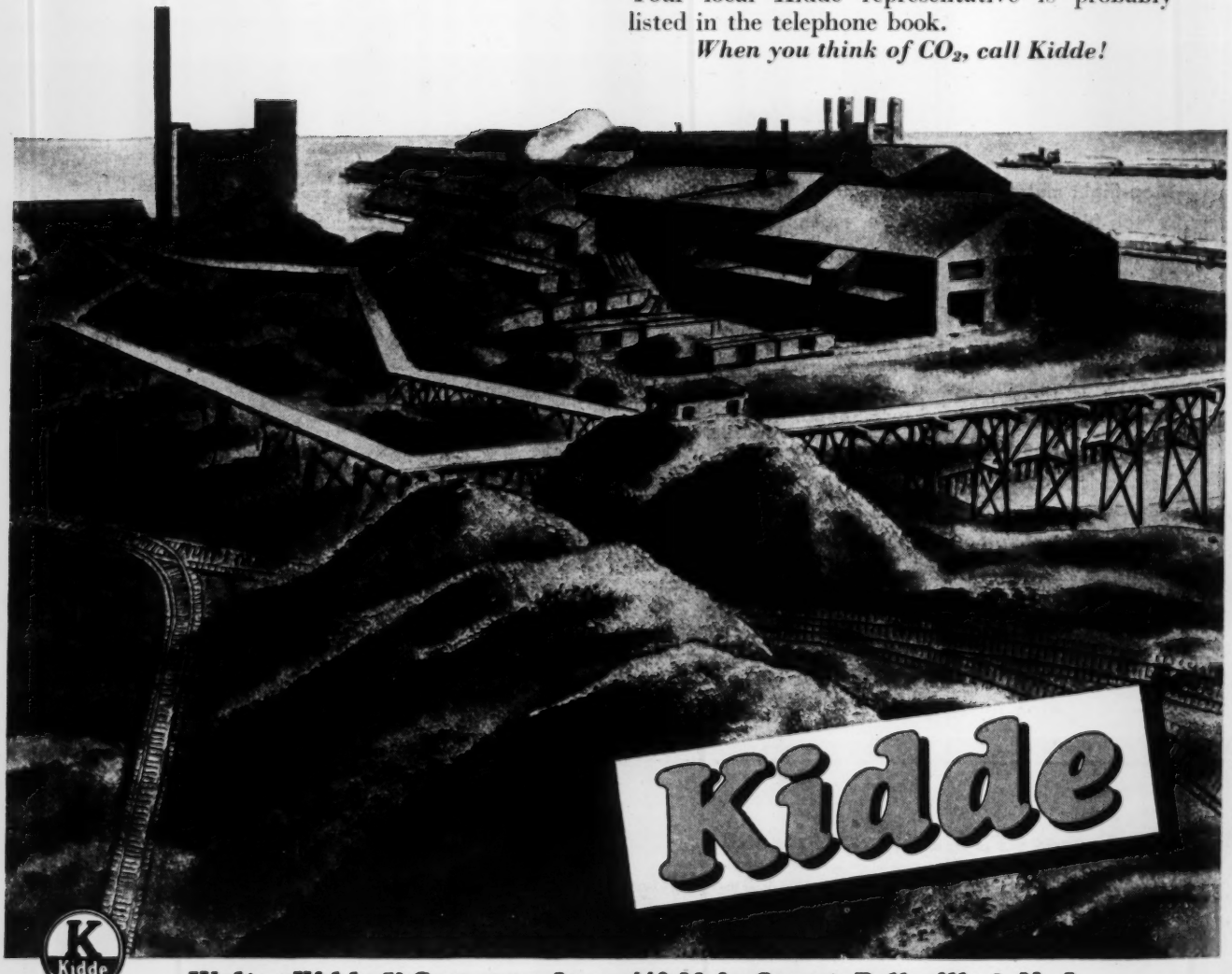
That hazard is taken care of in a mighty effective way at the East River Plant of Consolidated Edison Company of New York—by a *Kidde* automatic extinguishing system.

If a fire breaks out in the duct, the system goes into action fast. Pressure trips operate to close the duct dampers . . . flame-smothering carbon dioxide (CO_2) pours through *Kidde* Nozzles directly into the duct. The flames are out in a few seconds—*and the unburned coal stays dry, clean, ready for use.*

It's in cases like this—where hazards are toughest—that Kidde skill counts *most.* It will pay *you* to bring your fire-protection problems to us.

Your local Kidde representative is probably listed in the telephone book.

When you think of CO_2, call Kidde!



Walter Kidde & Company, Inc., 660 Main Street, Belleville 9, N. J.

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– it's the steel

Heppenstall Forgings are made from Heppenstall acid open hearth carbon and alloy steels—melted from selected raw materials. Or, from Heppenstall Electric Induction Steels (E.I.S.)—distinctive tool steels melted to close chemical limits in small electric induction furnaces.

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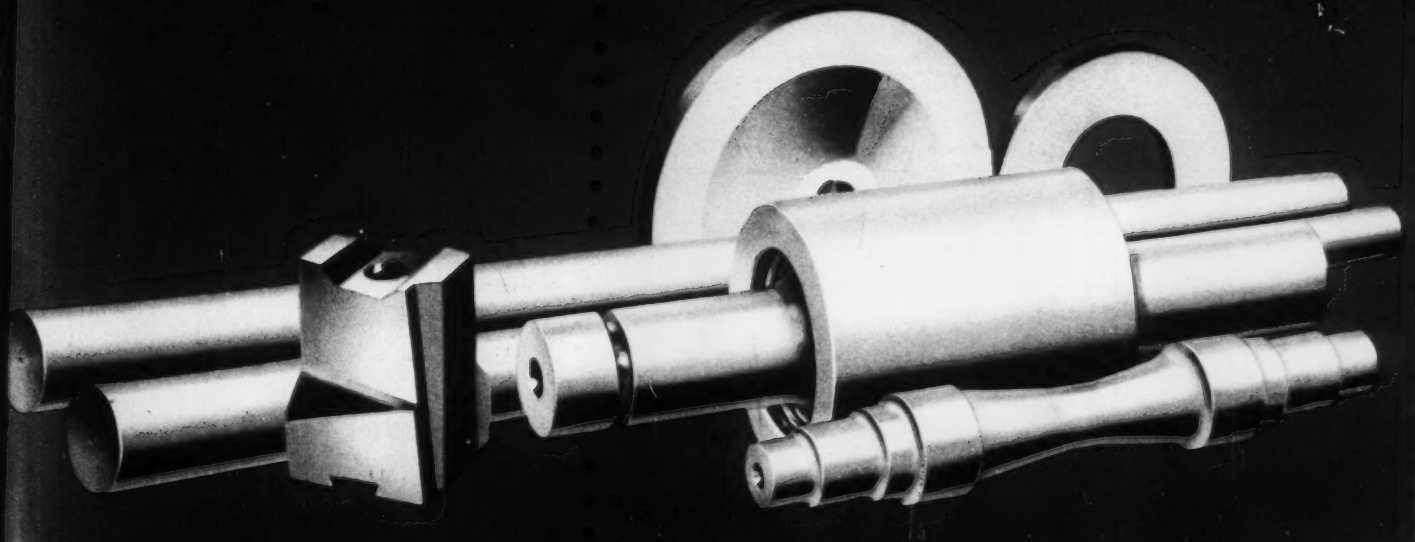
Adding to the skill and experience gained in 60 years of steel-making and forging practice, modern Heppenstall research works continually to improve today's steels and develop better forgings. The best possible quality is assured through careful inspection and supersonic testing so that each Heppenstall Forging you place in service yields a longer service life—at lowest overall cost.

Heppenstall Company, Pittsburgh 1, Pennsylvania.

why do Heppenstall Forgings give longer-service



—the most dependable name in forgings

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You can save freight costs by ordering mixed cars of Ferro Manganese, Ferro Silicon and briquettes. Specify standard grade lump, regular sized or briquettes in bulk or containers.

Test Tennessee's dependability—place an order for your next requirement of Ferro Manganese.

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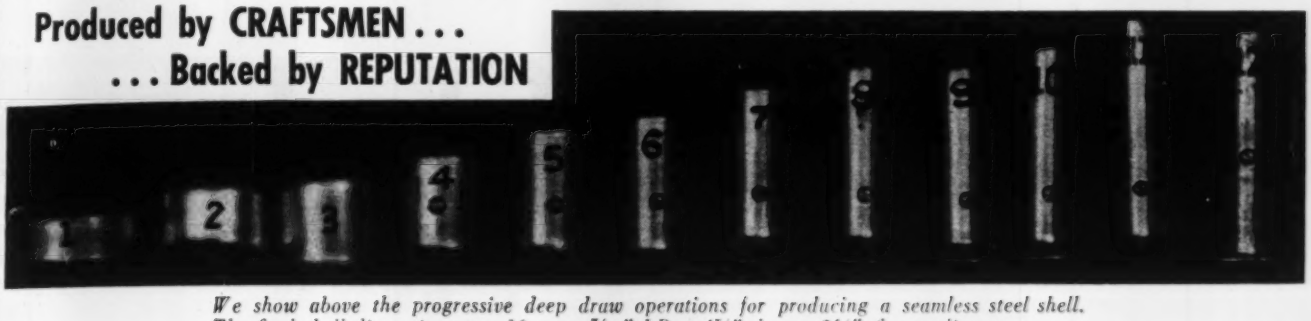
. . . Backed by REPUTATION



We show above the progressive deep draw operations for producing a seamless steel shell. The final shell dimensions are: 16 ga. x 7/16" I.D. x 4 5/8" deep x 2 1/2" flange diameter.

The Leake Stamping Company, although young from the standpoint of time since it was organized, is old in experience and craftsmanship. It is made up of men who have spent years working in the metal stamping industry. We take pride in our work and get satisfaction from solving difficult pressed metal problems. We know our business and like to be challenged.

The impossible has been accomplished many times . . . phases of production solved which defied many attempts at further simplification or solution. By utilizing knowledge and experience in the shaping of metal, unusual economies have been effected.

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The Leake Stamping Company has established a reputation that is based on a long list of satisfied customers . . . firms which have used our services on repeated occasions. A reputation has been earned for unit cost reduction . . . engineering and designing parts to reduce the number of operations required, substitution of lighter and stronger metals for bulkier parts, reducing costs of machining and assembly, and delivery of completed parts on schedule.

In addition to our pressroom facilities, our prime coating, welding, brazing, induction heating and machining departments, together with our die shop and engineering staff, permit us to offer for your consideration a complete "one-stop" service.

● CAN STAMPINGS SAVE YOU MONEY? Can your product be made more economically from stampings? Leake engineers will be glad to investigate for you with no obligation.

PRESS CAPACITIES:
Up to 2500 tons . . . Up to 66" stroke . . . Up to 72" x 150" bed area . . . Mechanical or hydraulic . . . Single, double, or triple action.

MATERIALS:
Carbon or alloy steels . . . Magnesium or aluminum alloys . . . Copper or brass alloys . . . Stainless or monel metals . . .
— ANY —
Size! Thickness! Shape! Analysis!

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EXPERTS IN PRESSED METAL
COMPLETE PRESSROOM—MACHINE SHOP
HEAT TREAT—BRAZING—WELDING
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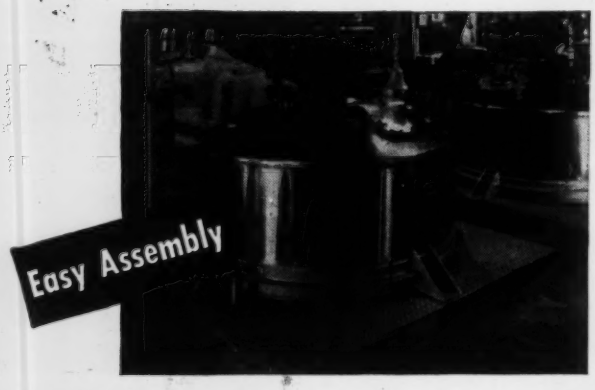
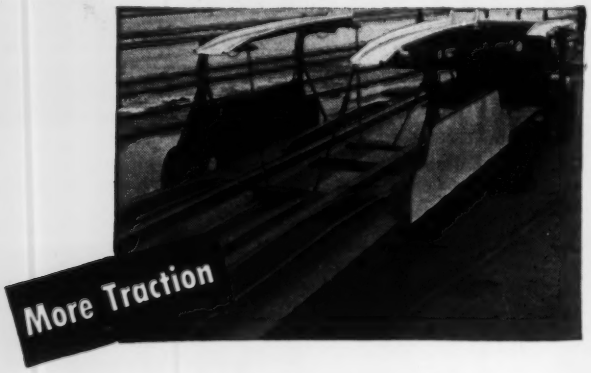
For greater safety under foot, in your plant and on your products

Inland 4-Way® Safety Plate





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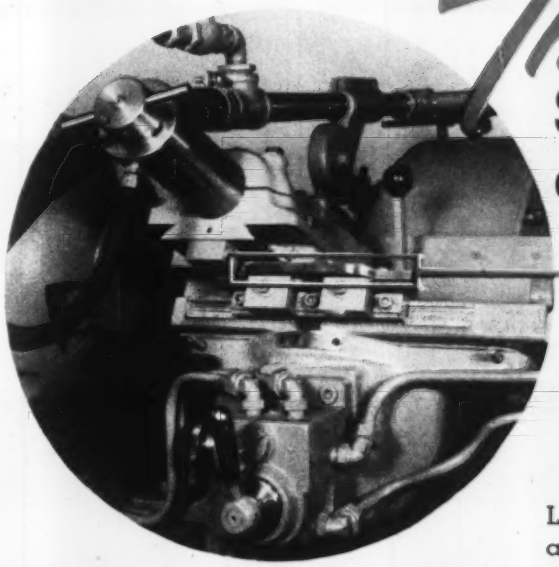
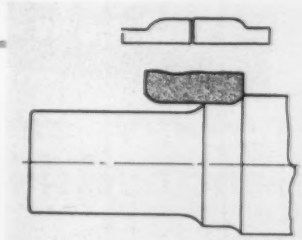
This Rounder—

SETS THE STAGE FOR LOWER COST of Grinding Axle Diameters and Radii



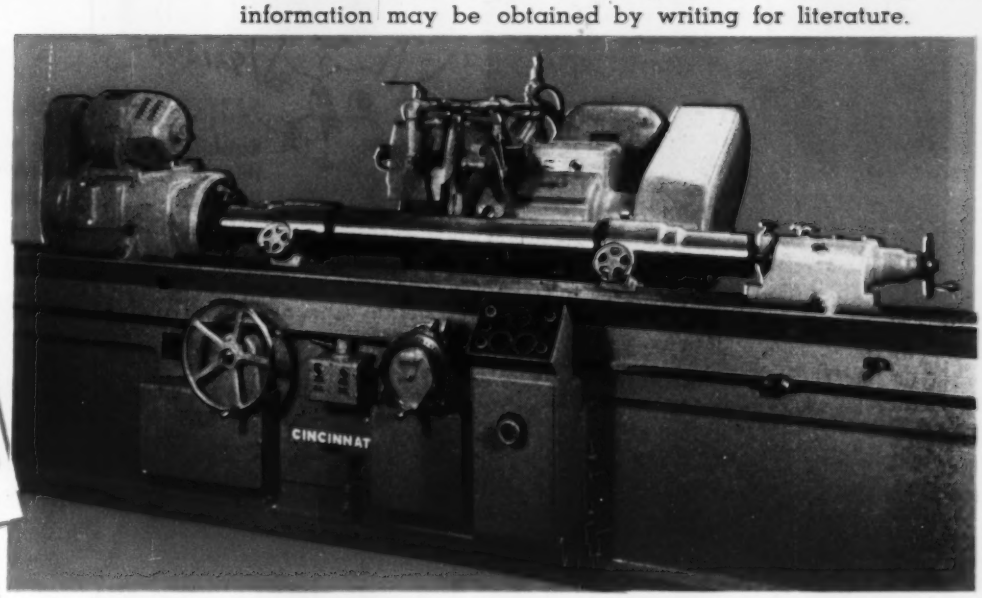


Left: Close-up of hydraulic profile grinding wheel truing attachment. *Right:* Drawing of profile cam and corresponding radius produced on wheel and work. Cams for this installation can be easily interchanged; cover a range of ¾", 1" and 1½" radii.

Long heavy work and several precision ground diameters with accurate sweeping radii are hard taskmasters for center type grinders. When these factors are combined in one part, such as the car wheel axles illustrated, extra good performance is required of the machine. CINCINNATI FILMATIC 14" and 16" Plain Grinders offer this extra value of performance, for the diameters and radii of the work can be precision ground in one setting. ¶ FILMATIC Grinding Wheel Spindle Bearings, well-proportioned castings for the principal units, and electronically controlled table traverse with automatic pressure way lubrication, contribute largely to the machine's dependable performance. Another feature—hydraulic profile wheel truing device—accurately rounds the corners of the wheels, one side or both sides, identical or different radii. This truing device accommodates several cams, corresponding to the radius desired for various sizes of axles. Two loading devices complete the equipment which makes CINCINNATI FILMATIC 14" and 16" Plain the most dependable and lowest cost axle grinders for your shop. More information may be obtained by writing for literature.

Close-up of ground diameters and radii on railroad car axle. One of the loading cradles is shown to advantage in this illustration.

FILMATIC



CINCINNATI FILMATIC 16" x120" Plain Grinding Machine with profile wheel truing equipment and loading cradles to facilitate grinding operations on railroad axles. Complete data in new catalog No. G-594.

CINCINNATI

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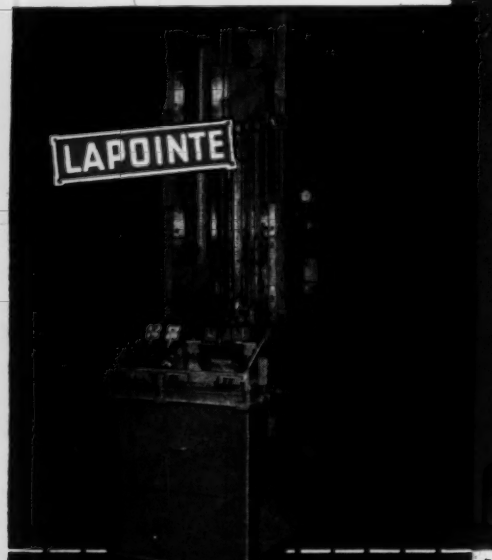

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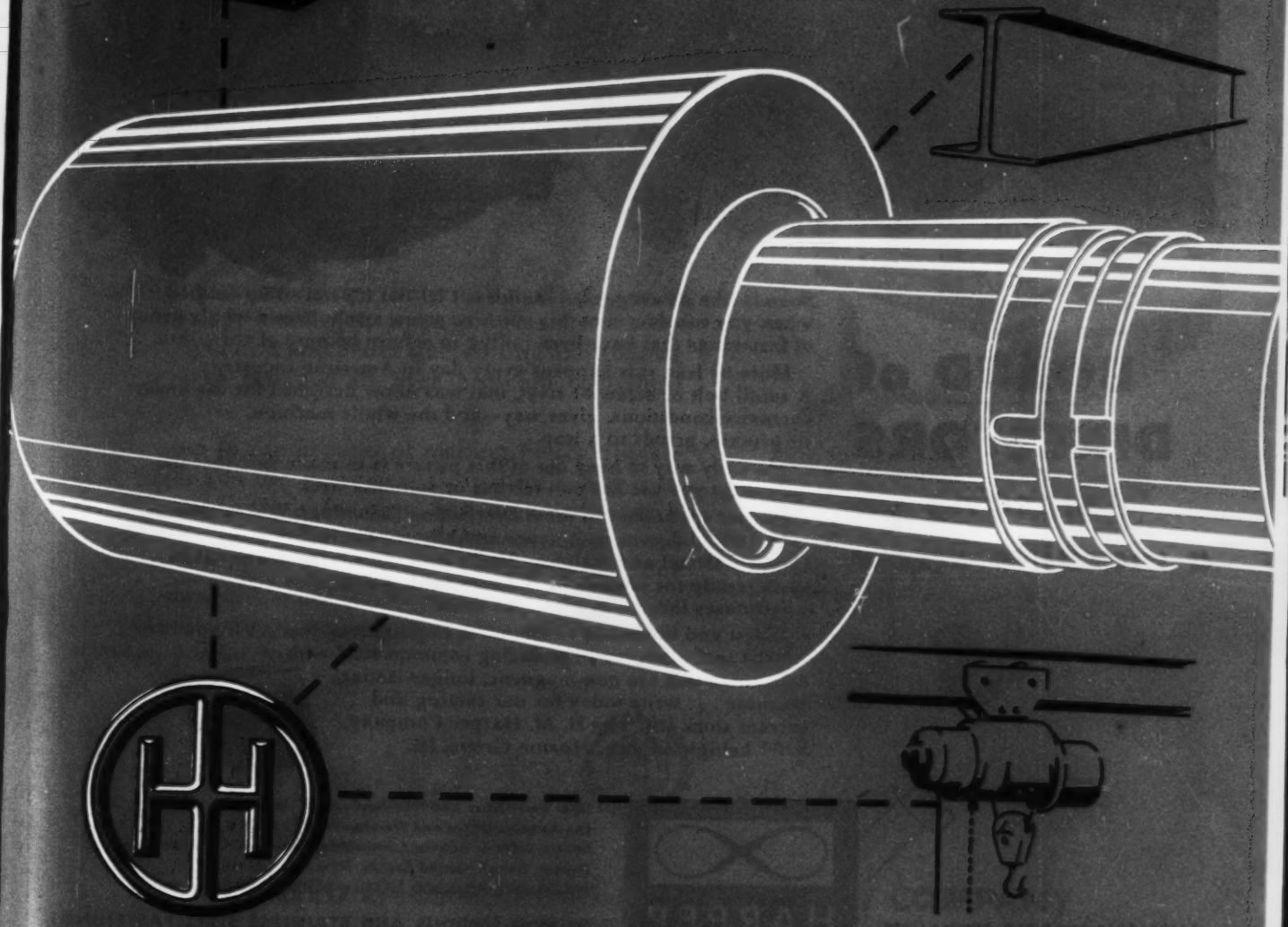

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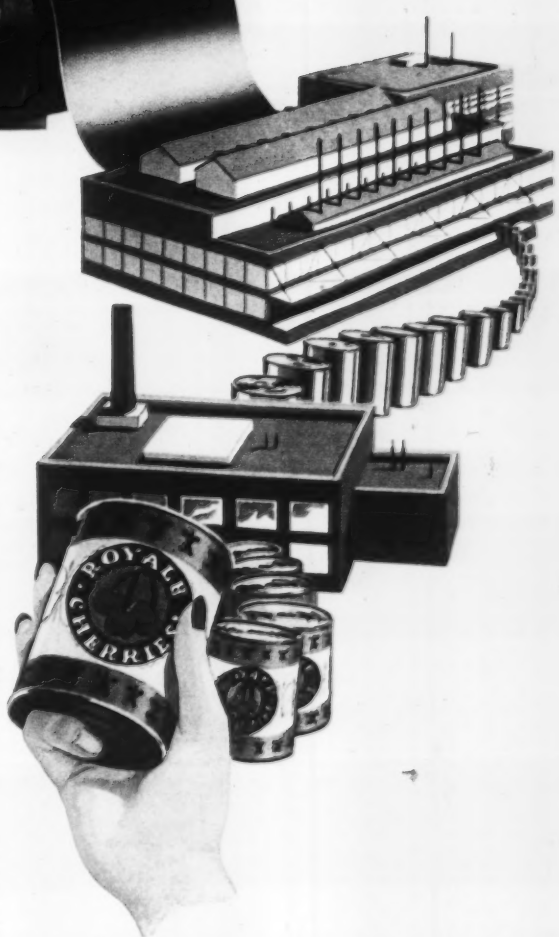

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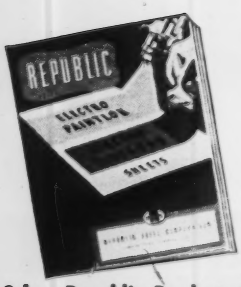

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**Mackintosh-Hemphill Company dates from 1803*

MACK-HEMP ROLLS for rod mills have been used by major steel companies since 1840. M-H engineers recently developed **GARRISON SPECIAL #1**, a new addition to the green-striped red wabbler family for rod production.

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Black Sheep

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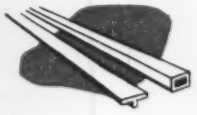
To his surprise, he learned that magnesium is easily fabricated (About 37 million pounds were used last year). From free Alcoa books on designing and fabricating magnesium, he found that extruded shapes would eliminate all but a little machining. Now his hand trucks are assembled from Alcoa  extrusions. They're lighter, stronger, cheaper to make. Every month sees their sales curve climb a little higher.

These two free books on magnesium and our broad technical experience can help your products, too. Write Aluminum Company of America, 2107F Gulf Building, Pittsburgh 19, Pa. Sales offices in principal cities.

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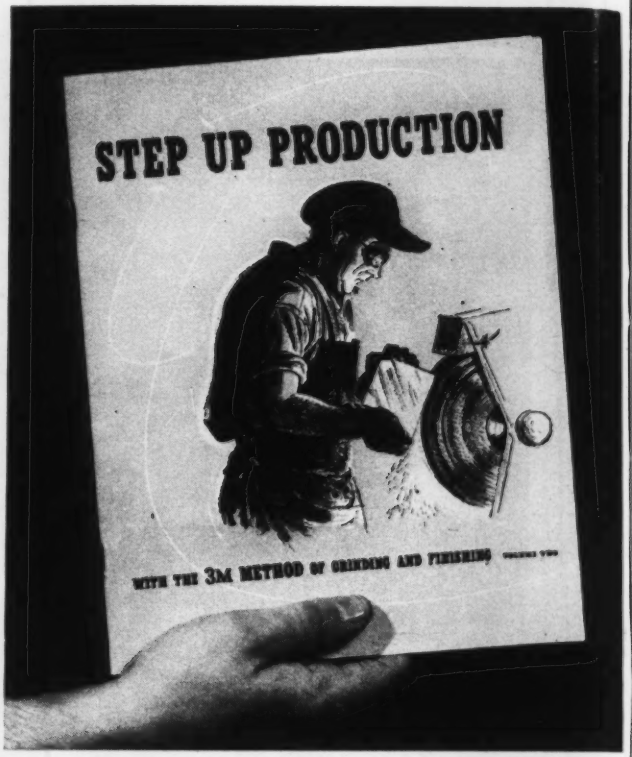

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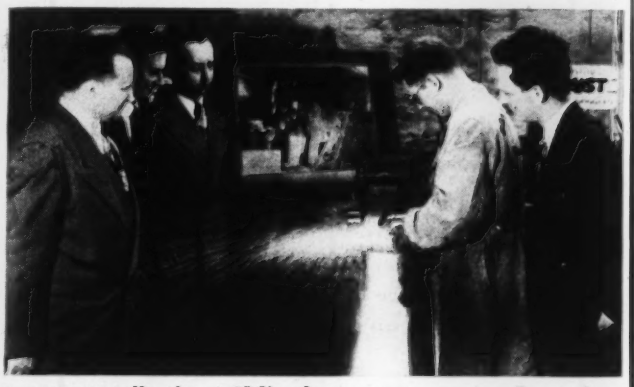

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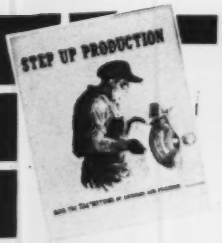

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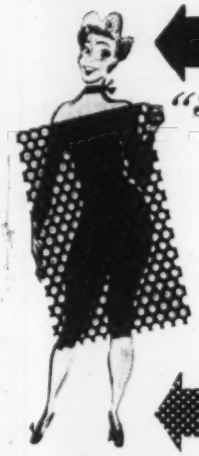

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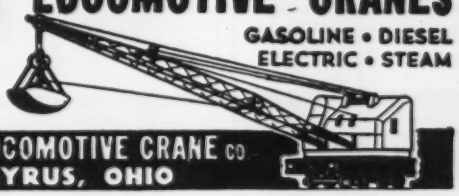

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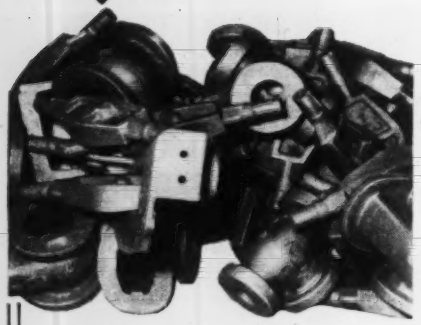

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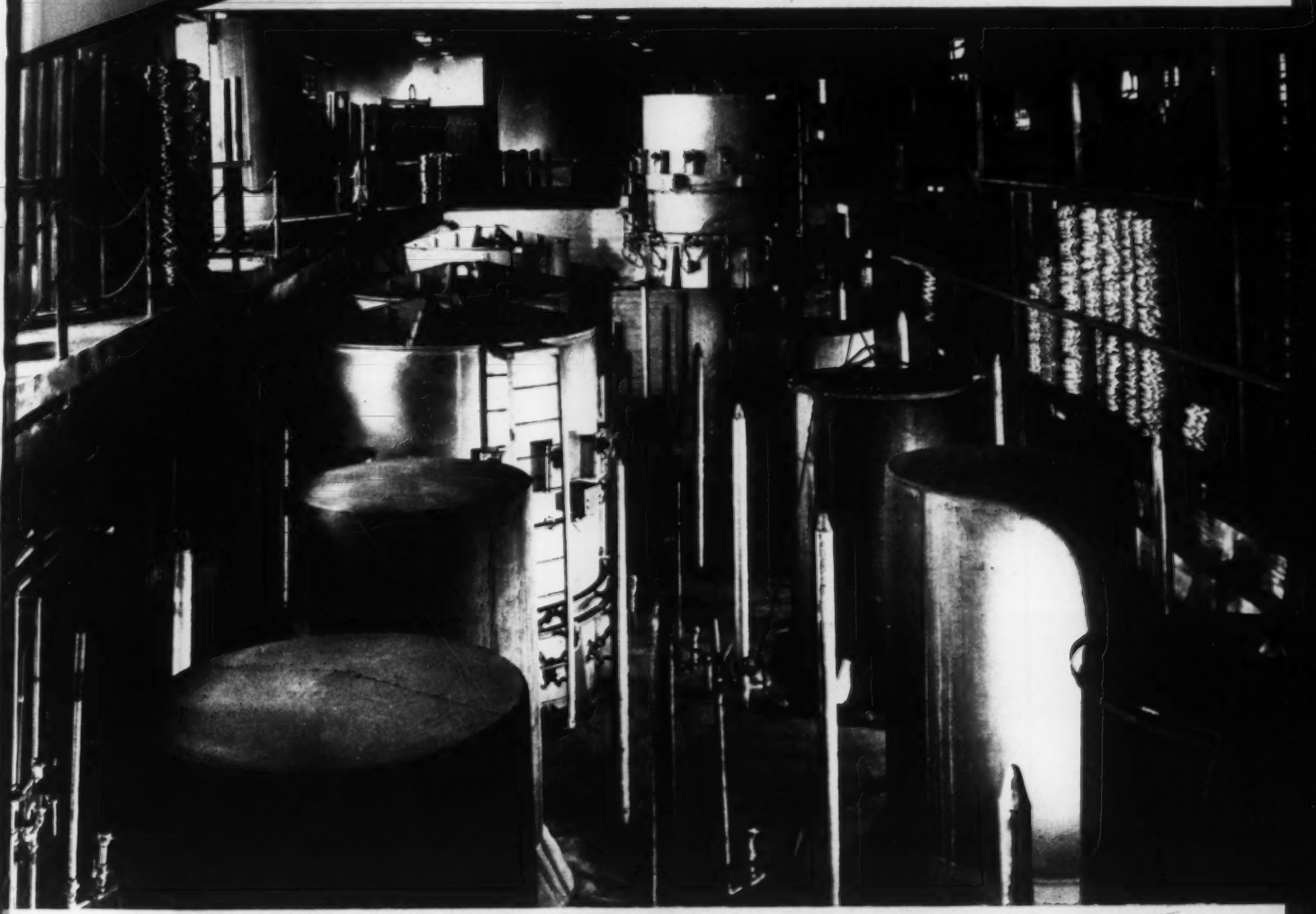

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